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APRIL, 1920

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MINNESOTA MEDICINE

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ORIGINAL ARTICLES

RATIONAL TREATMENT OF CARCINOMA OF THE UTERUS*

J. WARREN LITTLE, M. D.,
Minneapolis, Minn.

In the United States, 80,000 persons die each year from cancer. The recorded cancer death rate appears to be increasing in nearly every country in the world. The rate per 100,000 has risen from 62.9 in 1900 to 78.9 in 1913. In Minnesota, the rate per 100,000 has risen from 37 in 1900 to 82 in 1917, 83 per cent of the deaths occurring at the age of 45 and over. The average age is 59 years. Among women, one death in eight, and among men, one in every fourteen is due to cancer. Statistics may be cited to show that the uterus is first in the list of organs effected by primary cancer.

Janeway states that from latest and best statistics from 8000 to 9000 women die from carcinoma of the uterus, in the United States, each year.

Welsh collected from literature, 31,000 cases of cancer, of which 29.5 per cent were of the uterus, 21.4 per cent of the stomach.

Orth says that carcinoma of the uterus forms 30 per cent of the cancers occurring in women. The United States Census of 1911, however, shows a marked predominance of cancer of the stomach and liver, over cancer of the female genital organs, owing chiefly to the better classification of sarcoma, myoma and cancer of vagina and ovaries from cancer of the uterus. The cases of the latter disease have tended to decrease in statistical observations, but it may still be said that carcinoma of the uterus is perhaps the most frequent seat of the disease in women.

In view of the appalling prevalence of carcinoma of the uterus, it is of the utmost importance that an early diagnosis be made. To do this, we must try to educate the physician as well as the patient and insist upon a thorough visual as well as bimanual examination being made, whenever any symptoms indicating malignancy occur.

In spite of propaganda carried on to this effect, it is estimated that in this country only about 10 per cent of the cases presenting themselves for treatment are suitable for radical operation. In the absence of positive knowledge as to the cause of carcinoma, we must assume that it is purely a local process in its early stages. This assumption has warranted the surgeon in attempting its cure by radical operation. As a consequence of the anatomical relations and the difficulties of dessecting out the uterine lymphatic distributions, the results from the application of radical, surgical removal of carcinoma of the uterus, has not been satisfactory. The radical Wertheim operation has not met with general favor by the American profession owing to its high primary mortality and to the distressing sequelae.

Jacobson reports on 556 operations done by ten surgeons following the Wertheim technique, a primary mortality of 131, or 23.11 per cent; and the permanent cures after five years, 144 or 25.44 per cent. The average operability is 35.1 per cent. Wertheim's own figures for his operations are 714 operations with a primary mortality of 119 or 16.6 per cent, and the permanent cures after five years of 186, or 42½ per cent. His operability is 50 per cent and absolute cures, based upon the number of patients observed, is 20 per cent. Ten per cent of Wertheim's operations have ureteral vesicle and rectal fistulas and other complications. Are we justified in doing an operation with such high mortality and such dangerous sequelae for such a small number of cures?

*Read before the Minnesota State Medical Meeting, Oct. 1-3, 1919, Minneapolis, Minn.

There are other peculiarities about malignancy of the uterus that should be taken into consideration in the surgical treatment. Carcinoma of the fundus of the uterus tends to remain localized and does not metastasize easily until after it has reached the sub-serous covering of the body, and early removal of the uterus has given as high as 75 per cent of cures. On the other hand, carcinoma of the cervix, which Wertheim estimates twenty times more frequent in its occurrence than carcinoma of the body, invades the parametrium and lymphatics early and makes cure by radical surgical removal, very difficult.

Malignancy attacking the vaginal portion of the cervix may be considered under two clinical types. The fungating or papillary type, and the infiltrating or ulcerating type. This distinction is made not so much on histological ground as for the convenience in emphasizing the difference in treatment and prognosis. In treating the former, the fungating or papillary type where fungoid growths occupy the vaginal cervix and project into the vagina, are infected and produce more or less toxemia by absorption from its own ulcerating and infected mass, or produce pyometra by extension and interference with drainage, we have preceded the application of radium by thorough destruction of the mass with a cautery iron, being careful not to damage the bladder or rectum. This procedure facilitates the application of the radium to the outlying portions of the growth and the relief from toxic absorption results in marked improvement in the patient's general condition. This type of case responds very well to radium and is slow to invade the lymphatics or other organs.

The infiltrating or ulcerating type early destroys the cervix with crater formation, extends on to the vaginal wall and invades the bladder and rectal septum. It is more rapid in extending into the parametrium and fixing itself to the pelvic wall. Intermittant hemorrhage and pain are more pronounced than in the preceding type.

Radium checks the local process readily in the early stages of this type but metastases in gland or parametrium may be only temporarily inhibited, and destruction of life by interfer-

ence with or invasion of the intestinal or urinary tract is liable to occur.

Malignancy arising in the cervical canal early invades the substance of the cervix and may extend directly into the parametrium or metastasize into the distant lymphatic glands without extensive involvement of the immediate surrounding tissue. In other words, the size or age of the growth bears no relation to the extent of the metastases. It is in this type of cancer that surgery has had to recognize its limitations and the question as to whether to operate or ray them, is now receiving serious consideration.

The gratifying results obtained from the use of radium as a palliative remedy in the hopelessly inoperable cases, have lead to its application in the border-line and operable cases with results that compare very favorably with those that have been obtained by the more radical surgical methods with their the high primary mortality and distressing sequelae.

The strong argument for the radical abdominal operation has always been the fact that it is the only method by which lymphatic metastases may successfully be removed, and yet few of the cases with such metastases have ever been cured by operation. The facts are now generally accepted that radium exerts a destructive and inhibitive effect upon the malignant cells, and that it is an effective agent for the destruction of malignancy.

Janeway concludes in his paper in "Surgery, Gynecology and Obstetrics" that the present evidence indicates that radium destroys the disease at this site to a greater distance than the knife is capable of removing it, and does this with no risk or inconvenience to the patient and only a small tax on the skill of the surgeon. Every effort should therefore be made to secure its general use throughout the country. He also states that this evidence may be premature in so far as operable cancer of the uterus is concerned. It is, however, conclusive for cancer of doubtful operability, and so strong for operable cancer of the cervix, that in the light of the other published observations the treatment of early cancer of the cervix by radium is, at the present time, justified.

At the present time there have been a great many reports from various radium clinics,

showing apparent cures of from two to four years standing in cases too extensive for operation, and it has produced cures of three years standing and over, in a larger percentage of early cases than operation has produced.

There can be no question but that in the treatment of the large number of inoperable cases of carcinoma of the uterus radium has produced most gratifying results. Many of these cases that present themselves at a time when the disease is well advanced, with large fungating masses and most foul smelling discharge accompanied by more or less toxemia and infection, pain and hemorrhage, are transformed as if by magic in the course of a few weeks. The evidence of the disease disappears, all the symptoms are relieved, the patient gains in weight and strength, her blood picture improves, and to all appearances she is cured. Masses that have occupied one or both broad ligaments with apparent fixation to the pelvic wall will sometimes be absorbed and more or less movement of the uterus be restored, changing what has appeared to be an inoperable case into an apparently operable one. It is our opinion however, at this time, that operative interference should not be attempted in such a case until after at least a year of quiescence has elapsed, if at all.

CONCLUSION

In carcinoma of the body of the uterus, a panhysterectomy should be done followed by prophylactic radiation.

In cervical carcinoma in the operable stage, either panhysterectomy followed by radiation or a thorough radiation without operation should be performed. From our present experience and observation, we are inclined to the belief that as good or better results can be obtained from radiation alone, with practically no danger or pain to the patient, radium penetrating beyond where the knife can be used.

In inoperable cases, radium is much superior to any other treatment. Where there are large fungating masses producing toxemia, they should be removed with cautery followed by radium.

We have abandoned the Percy cautery for radium. We do not advocate the Wertheim operation because of its high primary mortality, its serious sequelae such as vesicle, ureteral

and rectal fistulae and because there are too few cures to compensate the difficulties and dangers encountered.

DISCUSSION

DR. J. C. LITZENBURG, Minneapolis: Radium seems to be going through much the same course that every other treatment for cancer of the uterus has gone through. Any new or comparatively new method of therapy must go through four different stages. In the first place, when it is introduced it is belived in, by its introducers, and that period I call the period of neglect. Then by the results of their assiduous work the attention of the profession is directed to its use, and then it is used more or less promiscuously, judiciously and injudiciously. That is the period of exploitation. Then comes the reaction against the injudicious use, with the improper selection of cases, and we have a period of reaction against the use of whatever therapy it is. Those who have been using it promiscuously and without good judgment, become frightened by the bad results because of not using good judgment. Then we come to the period of rehabilitation. Everything that has been used in the treatment of cancer has gone through such periods. I take it that radium is now going through the period of exploitation, and that we must be very careful in analyzing the results that are reported from time to time, in analyzing the man that reports them and exercising judgment in coming to a conclusion. All these stages are necessary for the proper establishment of any good thing in our profession.

The Wertheim operation went through it all, has been in the stage of very bad reaction and has been very lately rehabilitated. I think, however, in so far as the treatment of inoperable cancer is concerned that radium or radiation has been pretty well established. It should not be forgotten in connection with radiation that radium is not the only radiating agent, and that the X-ray, properly applied by an expert, also gives good results.

I had a very interesting experience in Berlin, just as I escaped the war, in the University Clinic there, where the X-ray man had charge of all the cases of cancer that came into that big clinic. They had stopped operating entirely and were using deep X-ray therapy and had been reporting results quite equal to the reports of Dr. Little today. The thing that impressed me most about the use of radium in cancer is that its good results certainly justify further judicious experiments with it.

One particular danger which should be considered is the toxemia following its use. The period of reaction against any therapy comes chiefly from its promiscuous use and from men who do not recognize the dangers of employing any particular agent. It seems to me, that we have not yet arrived at the point where we can say positively that radium has taken the place of operation, but we have arrived at the point where we can say it is certainly a valu-

able therapy in itself, but probably is more of an adjuvant and a help in preparing the cases for operation and in subsequent treatment in destroying tissue which may have been left by the knife. Every paper I hear on cancer of the uterus impresses upon me the one fact that we are all desirous of combating this terrible scourge, and the figures of Dr. Little seem to indicate that it is rapidly on the increase. Our only hope is in propaganda and the education of the people so that these women will come to the physician for examination, not when their cases are inoperable but when cancer is suspected. I am reminded of the time when every laceration of the cervix was repaired for all sorts of symptoms, particularly nervous symptoms. Of course there has been a reaction against the exploitation of that operation, but I have wondered whether we have not gone too far in that; that perhaps not enough cervices have been treated after laceration and that reaction against the repair of lacerated cervixes was due to the fact that it was injudiciously done and not in accordance with indications. I fear we have gone too far in that respect, because so far as the etiology of cancer is concerned we have learned only one fact, and that is the presence of chronic irritation. Perhaps we may have to do more prophylactic work with these patients and if we educate them to come earlier we must know about the early symptoms of cancer of the uterus.

DR. ROBERT EARL, St. Paul: We have had some little experience with the treatment of cancer of the uterus with radium. I believe I can heartily concur in all that Dr. Little has said. I am glad indeed to have heard him bring out the point that we can destroy considerable of this lethal tissue by the actual cautery, and afterwards treat the case by radium and in that manner get away from the absorption of toxins.

I believe it was Janeway who brought out the method of making a plaster mold of the cervix and placing radium in the mold and applying it to the cervix, thereby getting application from outside of the cervix. You can then establish protection of the bladder and rectum and, at the same time, introduce radium into the cervix. With that method of treatment he was able to accomplish more than by placing the radium in the cervix.

In treating cases of uterine carcinoma with radium and subsequently operating, we are probably going to get into considerable difficulty in the operation because the tissues will be so hard that they are difficult to cut and to manipulate. We have been in the habit, in our limited experience, of applying the radium to the uterus from the inside and then treating with the deep X-ray therapy from the surface. In that way we have been hitting it from both directions and with two remedies each one of which is very potent.

When I have a case of menorrhagia in which I am in doubt as to whether or not there is malignancy in the fundus, or if the menorrhagia is due to a non-

malignant condition, a fibroid for instance, I am always greatly at a loss to know whether I should do hysterectomy or if I should treat the case with radium. These cases we have to differentiate in the best way we can, and in all of them we should certainly curette and examine the specimen removed by the curette. If it is found malignant we can go ahead and do a hysterectomy; if not, treat the case with radium, and in these cases of menorrhagia the results from the treatment of radium have been most gratifying.

DR. F. A. DUNSMOOR, Minneapolis: This paper of Dr. Little's on radium has brought to my mind the thought that when the subject of cancer is up for discussion, what an important study the cure of cancer is, and the one thing which impresses me is the fact that the people as well as physicians and surgeons should be educated so that the early discovery of cancer is brought to the attention of the physician who is to treat the trouble. If we are going to talk about the cure of cancer, we must talk about actual cures of the disease, so that when the disease is removed it will not return. To do this it is very essential to impress upon the physicians and the people at large the importance of getting these cases at the earliest possible moment. It does not make any difference whether you use paste, chlorid of zinc, the hot iron, or what not, but let us get down to brass tacks and admit that if there is any one stage in which cancer can be cured, it can be cured by the knife and stay cured. Unquestionably we can do a lot for those people who are so unfortunate as to be suffering from cancer. There are a lot of others who are not going to be cured, but does that mean they are not going to get any relief? Not at all. We do not have to say they are going to be cured. As the doctor has said, most of the inoperable cases are not going to be cured. They may be relieved temporarily. If radium will do what Dr. Little says it will do, then it should be used. We should not condemn a thing because it will not cure cancer in any stage, but when a remedy as potent as the hot iron or the chlorid of zinc is used, and used more extensively, we have got to adopt it. Radium will doubtless do everything that those remedies can do, and does do it with a certain amount of judgment applied to it. I do not imagine that if Dr. Little should find a case of beginning cancer in the fundus, if he did not have radium in his own possession, he would say it was necessary to apply it in that case, because if he has got a beginning cancer, he can cure it so that it will stay cured; it does not make any difference whether he uses the Percy hot iron or other methods of treatment.

We shall look forward to enormous benefits from radium as well as from other remedies and methods which the doctor has suggested. He did not narrow the subject down to the treatment of cancer by radium alone.

DR. LITTLE (closing the discussion): This is

pioneer work. We did not propose to tell you today that we know all about how much good radium will do. We are feeling our way along. We are working at it conscientiously, trying to do the best we can with it. We know it can do some things we could not do before. We are not placing radium above early operation for cancer. Operation should certainly be done in carcinoma of the body of the uterus, and a panhysterectomy should be done in preference to the use of radium, because there is no metastasis in the early stage of carcinoma of the body of the uterus, and you have a chance and a good opportunity to cure the patient without the application of radium.

Many cases have been cured by operation, but for fear there might be stray cancer cells left we advocate the application of radium with the hope that it may make doubly secure the operation.

Operation on the cervix is a very different thing. How many of you have seen cases of cancer of the cervix cured by operation? Very few. There will be an occasional case in which a cure is brought about, but in my experience I have seen very few carcinomas of the cervix cured by operative procedures.

The X-ray is quite similar in its effects to radium, and for that reason I advocate radium in preference to the X-ray because you can apply it to the part much more accurately than you can the X-ray. We often use the X-ray in conjunction with radium, and I am pleased that we have in our community Dr. Bissell, who is an expert in the giving of deep X-ray therapy, because I have seen his work and know it is productive of great good. I am not saying that radium is superior to the X-ray except that I believe it can be applied more accurately, and you can gauge the dose of it much more accurately than you can the X-ray.

We have not arrived yet at the proper treatment of carcinoma. We are treating what appears to be now a local disease, not knowing exactly what the cause of carcinoma is. We do not know whether we are treating it the right way when we are treating it locally or not. We have not arrived at that stage of perfect treatment of carcinoma. We are not claiming that.

Dr. Earl spoke of applying radium outside of the cervix. We put the radium in a tube and place it right inside the uterus. In case the uterus has been removed we wrap it in several thicknesses of gauze and over that place rubber and put it up to the vault of the vagina. We do that whether there is any recurrence or not.

A case was referred to me a few years ago in which there was a recurrence of the disease in the vault of the vagina following a vaginal hysterectomy. We gave this radium treatment and the patient is now free from any signs of recurrence. The disease had reappeared in the vault of the vagina. That is better than we could have done before by any other method so far as I know. You could not

do it with the cautery, and there is no method equal to radium for that purpose.

Dr. Earl made a statement with reference to operation following the use of radium and saying that the tissue would be hard. The tissue of a radium scar is soft, not hard, and in the cases in which we have had a chance to dissect out the scar we have not found that hard condition of which he spoke. Take a burn on the face or any place, where you have a hard scar, if you apply radium the scar will soften up instead of being hard like a keloid. If you apply it to a keloid it will certainly make the keloid soft and pliable and will not leave a hard scar. It is not the kind of scar you get from the use of the cautery.

In examining the uterus if we are in doubt whether or not there is a malignant condition, we make a curettement and examine the scrapings and find out whether or not the disease is malignant, and if it is malignant, we would make the operation the same day or hour the curettement was made.

With reference to the remarks made by Dr. Duns-moor, I always like to hear from him. He is a practical man and has seen and done a wonderful lot of work. The patient is entitled to some consideration if she has cancer.

We are getting to be a sort of clearing house for cancer. We do not know what to do with some of them. We get a lot of cases that we cannot do anything for. It is only human to do what we can for them, and if we can stop a hemorrhage, if we can stop a fetid discharge and render them comfortable for a few months or two or three years, we have done a great deal for them. I thank you for your attention.

RESULTS OF CHOLECYSTECTOMY*

By WARREN A. DENNIS, M. D.
St. Paul, Minn.

The report here presented covers those cases operated on during a period of three years, from Jan. 1st, 1915 to Jan. 1st, 1918. Out of a total of sixty-four cases, definite information was received from forty-nine.

The last case included is nearly two years old so that sufficient time has elapsed to permit of a reasonably fair judgment as to the results.

At the beginning of the period cholecystectomy was not employed as a routine measure although the belief was becoming crystallized that in any case of gall-bladder disease sufficiently pronounced to require operation at all, the operation of choice was cholecystectomy, and this gradually became the rule barring a small num-

*Read before the Minnesota State Medical Meeting, Oct. 1-3, 1919, at Minneapolis.

ber of exceptional cases. The purpose of the study was to determine, so far as was possible in so small a series of cases, whether or not the subsequent histories would show the rule to be a wise one to follow.

In considering the success or failure of a given operation account must be taken not only of the completeness of the relief of the condition for which it was undertaken, but also of its freedom from unpleasant sequelae. Operations in certain locations are particularly prone to these, and the gall-bladder region is in this class.

A good deal has been written as to the anatomic changes following cholecystectomy but almost nothing has appeared in the literature as to how the patient himself, or rather herself, has felt about the net results of the procedure. This report, therefore, will contain no reference to medical literature, but will be made up solely from the reports of patients operated upon in the private work of the writer.

The cases fall into two groups, those in which stones were present, and those without stones. From the first group, naturally, no conclusions can be drawn as to the relief of symptoms, since it is not possible to tell which should be ascribed to the stones and which to the chronic cholecystitis. The belief was expressed several years ago that colic, jaundice and acute inflammation should be regarded as signs rather of the complications of gall-stone disease than of the disease itself. If this view is correct, then it is probably fair to say that in the uncomplicated cases at least, the removal of the gall-bladder is the important factor. In all cases with stones a vicious circle is established in which chronic inflammation and stones react upon each other.

So far as untoward after effects of cholecystectomy are concerned, the cases having had stones have of course the same weight as those without.

The diagnosis, whether with or without stones, was made in every case but one on the presence of the well-known type of food idiosyncrasy, and of gas belching and distress after meals if these foods had been eaten. In the single exception noted the first symptom admitted was a colic, and as this occurred for the first time only six weeks before operation, and all of the large number of stones found in the gall-bladder were extremely small, it was thought that both the

stones and the cholecystitis were of such recent date that the typical symptom picture had not had time to develop.

Many cases, of course, presented additional signs and symptoms, such as colic, jaundice and acute inflammation in the gall-bladder and ducts, but as was just stated, these conditions are the signs of the complications which have resulted because of failure of recognition and appropriate treatment.

In the questionnaire sent out the information requested was: first, whether the patient had been relieved of the gas belching and distress; second, if not fully to what extent; third, whether there had been since the operation any tendency to disturbance of the bowels; fourth, whether there had been a gain or a loss in weight and how much, and, lastly as to the general condition now as compared with that before the operation.

Perhaps the chief cause for the collection of these data was the fact that several patients had complained of a tendency more or less pronounced to looseness of the bowels following the operation of cholecystectomy, and it was desired to ascertain whether or not others who had not mentioned it, had noted the same tendency. If at all general or pronounced it would have to be reckoned with in considering the question of operability in cases of chronic cholecystitis.

Of the cases without stones there were twenty-six from whom definite information was received. Of these twenty-three were women and three were men. The ages ran from 57 to 18, the average being 38 years.

Gas and distress after eating were relieved from three-fourths to completely in twenty of the cases, or 77 per cent; in three, or 11.5 per cent, they were about half as bad as before, while three patients, or 11.5 per cent, reported no improvement in this respect.

The three cases complaining of more or less diarrhoea, and from whom the suspicion arose that detailed reports might show that others had the same trouble, proved to be the only ones with it. Of these three one who was constipated before operation frequently has diarrhoea now. One who was normal before has an occasional diarrhoea now, while one who had it before is considerably worse now—3.8 per cent in each case. Three cases (11.5 per cent) who were

troubled by diarrhoea before, are normal now so that in only three cases, or 11.5 per cent, could cholecystectomy be suspected of being a factor in the causation of this symptom, while in three others there are as good reasons for ascribing to it the relief of the same symptom. The remainder, 77 per cent, having had no trouble either before or after operation, it seems fair to conclude that the gall bladder, present or absent, has little or nothing to do with the causation of this symptom.

Gain or loss in weight, in the absence of special reasons, is a pretty good gauge of general health. Of the twenty-six cases, eighteen, 70 per cent, had gained in weight from five to thirty pounds, an average of thirteen pounds. In five, 19 per cent, the weight had not changed, while in two, 7.7 per cent, there had been a loss, in one instance of twenty-five pounds. This was a woman fifty-seven years old, who herself ascribed the loss to her age. The other was a woman seventy-four years old, and her loss had been only recent, and following an apoplexy.

As to general condition twenty-two of the twenty-six, 84.5 per cent, declared themselves either perfectly well or very much better, while four, 15.5 per cent, reported themselves the same. None were worse than before operation.

It is interesting to note that the patient with the troublesome diarrhoea, a man, feels fine, except for that, and has gained twenty-two pounds in weight, and that one, a woman, who feels the same has gained five pounds in weight.

The cases having had stones at the time the cholecystectomy was done number twenty-one, of whom fifteen were women and six were men. The ages ran from 57 to 31, the average being 49 years. As to relief from gas and distress after eating, fifteen, 71.4 per cent, report it to be three-fourths or better. Two, 9.5 per cent, report it fair, and four, 19 per cent, poor.

In this group, four, 19 per cent, report some diarrhoeal trouble before operation. Two of these are entirely relieved, one is better, and one is the same. None report a change for the worse.

Fifteen, 71.4 per cent, have gained in weight from five to thirty pounds, or an average gain of fifteen pounds. Three, 14.3 per cent, weigh the same, and three, 14.3 per cent, have lost, one six pounds, one fifteen pounds, and one reports a loss of thirty-five pounds. Of these three one

is 75 years old, one is 61, and one is 50. Of interest is the fact that of the four cases reporting failure of relief from gas and distress, one had neither gained or lost weight, two had gained ten pounds each, and one had gained twenty pounds. Possibly the temperament, optimistic, or the reverse, may be rather an important factor in determining the returns made in some cases. In several this seems reasonably certain.

As to general condition 16, 76 per cent, report it good, three, 14.3 per cent, report a fair improvement, and two, 9.5 per cent, say they are no better than before the operation, although each of the two has gained ten pounds in weight.

The group without stones shows a higher percentage of relief from dyspeptic symptoms than the one with stones and this is doubtless accounted for by the fact that many of the latter were complicated cases, almost half of them being acute empyemas.

The title of the paper might perhaps better have been the "Effects of Cholecystectomy" than the "Results of Cholecystectomy" since the aim was chiefly to determine whether the operation relieved the symptoms for which it was done, and whether it left as a result any unsatisfactory after effects which could properly be ascribed to it. In order however that the record of facts may be complete it is proper to state that in two of the sixty-four cases death occurred following operation. One resulted from pneumonia on the nineteenth day after operation in a case which had been septic for some time before and which had stones in the common duct, jaundice and a typical septic cholangitis. The other case was one of ruptured gall-bladder with stones and pus scattered thru the peritoneal cavity. In neither of these cases could death be ascribed to the cholecystectomy, and they are therefore not included in the statistical report, but should not be omitted from the record.

In two cases hernia followed the operation, both being cases of acute empyema of the gall-bladder. There was no mortality among the cases of uncomplicated, cholecystectomy, nor did hernia result in any of them.

There is one condition, however, following the simple operation as well as those with stones and complications, which undoubtedly is a large factor in accounting for incomplete relief from

symptoms, and this is post-operative adhesions. If the pyloric end of the stomach becomes fixed in scar tissue gas distress after heavy meals is likely to result. This is the cause of complaint with four of the cases with stones, and of two without stones. The best preventive measure is the fixation of a layer of omentum between the cigarette drains and the stomach, and this is a matter of prime importance.

Gas distress of this character is due to mechanical interference with the stomach and duodenum. The characteristic pre-operative gas belching seems to be due to a different, and unexplained cause, which is perhaps toxic, perhaps due to secondary secretory changes. Some cases still retain this for a fraction of the foods which regularly caused it before operation.

In two cases with unsatisfactory results the symptoms are such as to arouse suspicion of a stone having been left in the common duct, or of its having formed after operation. If so, these cases have nothing to do with cholecystectomy per se, but they do open the questions of the advisability of removal of the gall-bladder in all cases, and whether exploration of the common duct is indicated in a case of acute empyema. Both questions should be decided in the affirmative unless in some most exceptional case. The stone, which in cases of acute empyema, as was pointed out in a previous paper, is always found impacted, and frequently pocketed, at the entrance to the cystic duct, is often easily overlooked and difficult to remove without much soiling of the field, when only drainage of the gall-bladder is done. The result is a much slower convalescence and greater liability to neighborhood infections. As to exploration of the common duct, it is believed that this should always be done, even in the presence of an acute empyema, when the symptoms cause a suspicion of stone in that location.

There is one other source of unsatisfactory results following cholecystectomy—incorrect or incomplete diagnosis. This error is most likely to be made, it is believed, in some cases of ptosis. The dyspeptic symptoms of ptosis are quite different from those of cholecystitis and the X-ray is definite for the former, but even if a ptotic case has also a chronic cholecystitis it should ordinarily be left alone, since cholecystectomy can not relieve more than a fraction of the

pathology. The lesson which was learned in connection with appendectomy in this class of cases applies with even more force in the case of cholecystectomy.

In conclusion, it would seem fair to say that the subsequent histories of these cases justify the conclusion that cholecystectomy should be the rule when operation on the gall-bladder is required.

DISCUSSION

DR. E. STARR JUDD, Rochester: I enjoyed reading Dr. Dennis' paper very much and likewise enjoyed listening to it, especially in view of the fact that several years ago I undertook a study of the results in cholecystectomy. At that time I tried to find out after a number of years how patients had gotten along without their gall-bladders and to see if the gall-bladder was really essential. I found 15 patients I knew of, who had been without gall-bladders for fifteen years or more, and apparently they were just as happy as ordinary individuals with gall-bladders, which is just a little different from the report Dr. Dennis has made. I also carefully studied the cases and found that quite a percentage of these 15 complained of the same gas in their stomach that they had before cholecystectomy was done. Aside from that, however, the patients were entirely relieved.

About the same time we undertook other studies. Dr. Dennis does not cover the anatomical changes resulting from removal of the gall-bladder, but I think the more we study them, the more knowledge we will get of the changes and the symptoms that occur.

In our experimental work which Dr. Mann and I carried on some years ago of removing gall-bladders from animals, we first found dilatation of the common duct which apparently continues, only the dilatation involves that part of the common duct outside of the duodenum, and there is no dilatation of the intrahepatic ducts. After the dilatation reaches a certain point the little sphincter muscle at the end of the duct first described by Oddi, and more recently by Archibald, becomes paralyzed, so that while the normal bile pressure in the common duct is 150 to 200 millimeters of water, after the gall-bladder has been out thirty to forty days, the bile pressure is practically gone. There is paralysis of this little sphincter muscle as a result. That, it seems to me, will explain the diarrhea that occurred in some of our cases following cholecystectomy. These patients would have a normal bowel movement in the morning, and once or twice a day they would have a movement of almost pure bile.

There are one or two points I want to mention that are not at all settled, one of which is hepatitis in association with cholecystitis, and whether the persistence of hepatitis could be the cause of some of these symptoms. Evarts Graham in a study of

cases at the time he removed the gall-bladder and removed pus from the liver for microscopic study, reached the conclusion that practically every case of cholecystitis had associated with it hepatitis, so this may explain some of the cases that do not get complete relief from the symptoms.

Another feature is the pancreatitis that is so often associated with these cholecystitis cases. I think that where pancreatitis exists, we used to consider it a contraindication to removal of the gall-bladder, but if our experiments are of any consequence, the removal of the gall-bladder is indicated especially when there is pancreatitis existing. If pancreatitis exists it is due to the fact that the bile enters the pancreas by back pressure from the Oddi sphincter, forcing it up into the pancreatic ducts and into the pancreas. Pancreatitis can be produced every time by injecting bile into the pancreatic duct. If we accept this as the etiology of pancreatitis as we see it in association with cholecystitis, and we have such men as Opie who first suggested it and Archibald who believes it is the cause of pancreatitis; if removal of the gall-bladder results in paralysis of the sphincter and does away with the bile pressure in the common duct, then we have a definite indication for the removal of the gall-bladder rather than drainage.

DR. EARLE R. HARE, Minneapolis: Dr. Dennis has reached the conclusion in his paper that wherever an operation is advisable on the gall-bladder the removal of the gall-bladder should follow; otherwise I would have no opportunity to inject into this discussion the old question we hear threshed out at every session whether or not the gall-bladder should be removed in all cases. With the small experience I have had, personally I am still conservative with reference to the removal of the gall-bladder in all cases. In that sense I am somewhat a professional heretic even yet. If we have a stone impacted in the distal end of the gall-bladder, we have then dilatation of the gall-bladder. If that be true, the removal of the gall-bladder obliterates the gall-bladder, and if we have obliteration of the gall-bladder by impaction of a stone in the distal end of the duct, we should have, as Dr. Judd has pointed out, paralysis of the sphincter muscle following the dilatation of the common duct. I do not believe that those of you who have seen the common duct following a long period of complete occlusion of the cystic duct will agree that there is a dilatation of the common duct. Now, there must be something different, that is, between the removal of the gall-bladder and the occlusion of the gall-bladder or its pathological removal, if you please, in the effect upon the common duct. If that be the case, then I still adhere to my former position that the removal of the stone which is impacted in the distal end of the duct, provided there is not sufficient pathology in the wall of the gall-bladder to have completely obliterated its function, and the drainage of the gall-bladder ought to be followed by a certain percentage of restoration of function in the

gall-bladder. If this be true we shall, unless it be in cases of pancreatitis, have done our patients just as much good as thru the removal of the gall-bladder. I do remove the gall-bladder in some cases, but I do not know when it is best to remove the gall-bladder and when it is best to leave the gall-bladder alone in all cases, and I do not believe there is anybody who knows that.

I have listened to discussions from one end of this country to the other on this subject, and that seems to be the consensus of opinion of those men who discuss it. In a certain percentage of cases, at least, the gall-bladder should be drained; that it should be given an opportunity to restore its function in part or in toto, and the patient resume his normal health. Now, I will say this, if we can by the removal of the gall-bladder remove all of the pathology, then I think it is the thing to do, but the fact that we have a hepatitis, that we have an inflammation of the ducts in the liver, that sometimes we have stones up in the hepatic ducts that we cannot remove, bile sand if you please, then if we remove the gall-bladder we are removing but a part of the pathology, and I believe we are leaving the patient in a crippled condition by the complete removal of the gall-bladder and by the consequent dilatation of the common duct and by the paralysis of the sphincter muscle which protects the bowel from the constant influx of bile.

DR. CHARLES H. MAYO, Rochester: I think all of us who have done much gall-bladder surgery have had some difficult cases to deal with and bad results. I think I have had my full share of every kind of thing that could possibly happen following gall-bladder surgery.

It seems to me, there are two or three principles involved in this discussion, one of which naturally raises the question of how the ducts work. Nature never delivers the duct directly to the surface of the body. It is always by indirection, always as a crooked outlet, and in the ducts, the mucous glands, and in the gall ducts, it runs for a distance between the muscularis and mucosa, and on account of internal tension the duct pinches up.

Keefe's work on resection of duodenums of cadavers and tying the ends with a view to finding out how infection may occur, whether it went up the duct or not, shows that he could rupture the duodenum every time before he could force anything whatever in the end of the duct. He found that the more distention he produced the tighter he pinched the duct between the wall and mucous membrane.

The question comes up with regard to the use of the gall-bladder. It is built like a duct. It consists of elastic connective tissue and muscularis and acts as a bulb which takes care in healthy people of an ounce of bile made by the liver each hour for a number of hours without letting us know anything about it. In the general surgery of the abdomen we find gall-bladders of all sizes according to the amount of bile in them. If we operate a second time

on a patient that has been drained, regardless of the fact whether the gall-bladder has been sutured to the abdominal wall or not, we will always find it adherent in a mass of adhesions.

With a normal common duct of one-sixth of an inch and a cystic duct of one-eighth of an inch in size, I have never seen a gall-bladder thrown out of commission by the surgeon or by disease, but when the common duct is larger than one-sixth of an inch, we have then a rim of muscle at the outlet of the common duct, and nature delivers from the pancreas through the same duct. Pancreatitis rarely exists of itself; it is secondary to gall-bladder trouble, and we have a basis for diagnosis in the presence of stones, in the glands that drain the gall-bladder, cystic, and the hepatic and common ducts.

It requires many examinations in all types of individuals with the abdomen open to tell the difference between a normal gland and a swollen gland. In human beings we have as many as three glands, one on the stomach, one on the common duct, and one on the cystic duct. In some human beings there are as many as six glands found.

We have secondary inflammation; we have interstitial pancreatitis very commonly, and it behooves surgeons in doing gall-bladder surgery to give a careful description of the condition of the pancreas present, because many of these people have acute colic and they describe their pains as being in the ducts. They have recurrent pancreatitis, and if you do not write that thing down at the time you will forget about it, and very often it helps you in your examination for things in the upper abdomen.

One-quarter of all people who have gall-bladder disease have no stones. We find it is the pelvis of the gall-bladder that is structurally increased; there is fatty degeneration of the mucous membrane here and not of the fundus. If we have a papillary growth of the gall-bladder, of which we have seen 180 cases, it is down in the pelvis.

In primary cancer of the gall-bladder the disease develops from chronic irritation due to stone. We have to think of that condition if we leave a diseased area and remove an impacted stone in order to get drainage.

What Dr. Judd said about gas symptoms is true, and in the after-treatment these patients complain of gas attacks as a part of their symptoms, and they should be looked after for a long time after operation to prevent gas distention. The stomach should not complain of what is put in it, but only of trouble caused during the process of digestion. Qualitative food dyspepsia is illustrated in leaving gall-stones. Qualitative food dyspepsia is associated with gall-bladder and pancreatic conditions, while quantitative food dyspepsia is associated with troubles in the lower abdomen and of troubles with peristaltic action.

DR. ARCHIBALD MACLAREN, St. Paul: Just a word or two in regard to my rather limited experience in surgery of the gall-bladder. Dr. Hare touched on a point which interested me, and that is,

it is very difficult to tell when the gall-bladder should be removed and when it should not be. My feeling is that the acute gall-bladder should seldom be removed because of my own personal experience. Acute gall-bladders are in my hands extremely dangerous, and I much prefer to operate upon a patient more than once, than to do the radical operation which ends all.

From acute gall-bladders of the gangrenous type, I have had a number of deaths, but how many I cannot say in the last few years. I did not have these deaths when I drained my gall-bladders. Drainage of the gall-bladder is a very difficult question to decide. I am often in doubt as to when to drain and when to remove the gall-bladder. I am more and more on the conservative side and am willing to drain more of these gall-bladders than to remove them, especially those of the acute type, because of the exceedingly high mortality. I have just had a death in an acute gall-bladder case. I happened to be in Omaha at about that time and I asked Dr. Jonas, one of the big surgeons in every way in this country, what he did with his acute gall-bladder cases, and he replied, "I never took one out yet; perhaps I will after while."

DR. A. C. TINGDALE, Minneapolis: I wish to recite a case in which the gall-bladder was drained a year ago by another surgeon. The case came to me recently and I removed the gall-bladder with a stone as large as a horse chestnut.

I would like to know if it is possible for that sized stone to form within a year or so, or was such a stone overlooked. It was a good surgeon who drained the gall-bladder, and there is no reason to believe that he left such a stone, and I would like to know whether that has been the experience of any of the operators here.

DR. DENNIS (closing the discussion): If Dr. Judd understood me to say that relief followed in all of these cases he misunderstood me. There is a certain percentage of them that still have trouble with gas, but most of them have very little trouble, most of it having been relieved.

In regard to cholecystectomy in these cases of acute gall-bladder, I drained them formerly, and I think I can answer Dr. Tingdale's question by saying that I think the stone was left in the gall-bladder. I have done it myself and so have other surgeons. I have left a large stone in the gall-bladder because I could not feel it on account of the thickened condition of the gall-bladder. This experience led me to take out the gall-bladder. I drained many of these acute gall-bladder cases and then made up my mind to remove the gall-bladder. It is easier to take these gall-bladders out than it is to drain them, and if you have a stone at the entrance of the cystic duct you can take it out without rupture, and you do not have adhesions after operation such as you have if you drain the gall-bladder. Not only that, the symptoms within two days, if you are dealing with a simple acute empyema of the gall-bladder,

are practically all cleared up. The temperature, instead of being up for a week or two weeks, drops back to normal and convalescence is uninterrupted.

The conclusions which I have arrived at and presented in this paper are the results of my own experience, and I wish to apologize here to Dr. Judd for having neglected to mention his studies along the same line a number of years ago.

In answer to the remarks of Dr. MacLaren, I think it is very much better to take out the type of gall-bladder that he refers to. If there is any question about the advisability of taking the gall-bladder out, it is in the acute case of empyema of the gall-bladder. I will grant that occasionally there is a case in which it is not wise to do that, and that is when the acute gall-bladder has no meso-cholecyst and hence, if removed, must be dissected out of the liver. In the exceptional case of this character it may be wiser to drain than to remove.

PALLIATIVE TREATMENT VERSUS THE RADICAL TREATMENT OF TRIFACIAL NEURALGIA*

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The treatment of trifacial neuralgia has varied from many different palliative to the most drastic methods. With the exception of the deep alcohol injection, the palliative measures have been of very little value, and the radical treatment was, at first, attended with so many complications that it was tried only as a last resort.

The etiology of trifacial neuralgia is still unknown. Frazier asserts that it may be due to a sclerotic lesion of the ganglion; Dana ascribes the probable cause to degenerative changes in the ganglion; Patrick does not accept either of these as causative factors in the etiology, and Sir Victor Horsley believed that it is due to an ascending neuritis from dental infection. This, however, has been objected to by a number of physicians on the ground that no anesthesia nor motor paralysis is present in patients suffering from *tic douloureux*. Sluder has reported cases that he believed were due to sphenoidal infection; he attributed the recurrence of pain to recurring infection. In the various cases observed at the Mayo Clinic, however, it is not at all uncommon to see patients who have had

numerous teeth removed, or repeated drainage of the antrum and accessory sinuses, or spurs removed from the septum who still complain of recurring attacks of trifacial neuralgia.

Trifacial neuralgia is distinguished from almost all other pain about the face and head by the severity and brevity of pain brought on by slight peripheral irritation, such as eating, talking, drinking, exposure to drafts, brushing the teeth, or washing the face. The pain is described by patients as shooting, jabbing, flash-like, darting, or burning, as if a red hot poker had been jabbed into the face. It differs from pain caused by sinus or dental infection as it is not constant and usually occurs during the waking hours. It is brought on by touching the trigger zones, as described by Patrick; "touching areas over the mandibular division may produce attacks of pain in the ophthalmic or in the supramaxillary divisions."

The disease usually occurs at about middle life; Patrick reports one case, however, in which the symptoms were manifest at the age of seven, and three in which the patients were seventy-five years of age. There are no predisposing factors, and, while some patients are neurotic, others are not. The disease is not hereditary; there are cases on record, however, in which several members of the same family were afflicted.

Formerly aconite, morphin, belladonna, and various courses of catharsis were used in the treatment. Local operations, such as removal of teeth, drainage of the antrum, and treatment of the nose and pharynx by local applications were later resorted to, and these methods are still employed by a number of surgeons. Avulsion of the peripheral divisions of the fifth nerve with insertion of plugs and screws into the inferior orbital and dental foramina was also employed. While avulsion of the peripheral divisions gives palliative relief for an average of eight months (Beckman) it is not satisfactory because repetition of the treatment is quite impossible, inasmuch as pain is apt to recur before the peripheral segments have regenerated sufficiently to permit re-avulsion.

Alcohol injection of the peripheral branches of the fifth nerve was first described by Pitres and Verger, in 1902, and by Schlosser in 1903. Hortel, in 1914, described the technic for in-

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jecting the gasserian ganglion with alcohol. The technic that is most often followed was described by Levy and Baudouin, in 1906, and slightly modified by Patrick in 1907. The alcohol is injected into the peripheral divisions at their exit from the foramina; this treatment is definitely indicated as in a certain group of cases it affords temporary relief; in others, relief is afforded for several years. I believe that every early case should be treated with one or two alcohol injections, and that the patient who is a poor operative risk, and the aged patient, should also be injected with alcohol instead of being submitted to the more radical treatment. It is true, of course, that each successive alcohol injection affords a shorter period of relief.

The first radical operation was performed by Rose in April, 1890, when he removed the gasserian ganglion for the relief of trifacial neuralgia, approaching the ganglion through the floor of the middle fossa. On account of the serious complications encountered in the way of bleeding and paralysis, he was compelled to abandon this procedure. Hutchinson, in 1898, advised a partial resection of the ganglion. He resected the outer two-thirds, including the second and third branches, thus saving the ophthalmic division and preventing complications in the eye. This operation relieves patients who are suffering from neuralgia in the second and third branches, but it does not relieve those who have an involvement of the ophthalmic division; besides, it is attended with serious bleeding. Spiller, in 1898, suggested the division of the posterior root, a procedure known as the "physiologic extirpation." Spiller and Frazier, in 1900 and 1901, carried out a series of experiments demonstrating that regeneration does not take place in the posterior root after it is divided, and, in 1903, their work was corroborated by Van Gehuchten. In 1918, however, Frazier reported a series of cases in which successful results had been obtained by the division of the posterior root.

In a review of the cases treated at the Mayo Clinic, it was found that from January, 1910 until October, 1919, 318 patients suffering from trifacial neuralgia have been treated. One hundred eighty-six of these were males, and 132 were females. Our records show that the average age of these patients at the time of

admission was fifty-five years, the average duration of trouble seven years, and the onset of the trouble, in the majority of cases, between thirty-five and fifty-five years. In 13 cases the onset of the trouble occurred after the age of seventy, 2 of the patients being seventy-seven years of age; in one case the trouble began at the age of fourteen.

Four patients had involvement of the ophthalmic division alone, 64 of the supramaxillary division alone, and 73 of the mandibular division alone. Twenty-two patients had involvement of the ophthalmic and supramaxillary divisions, 2 of the ophthalmic and mandibular division, 129 of the supramaxillary and mandibular division, and 24 of the ophthalmic, supramaxillary, and mandibular divisions, making a total of 52 (16 per cent) ophthalmic division involvements, 237 (74 per cent) supramaxillary division involvements, and 228 (70 per cent) mandibular division involvements.

Eight hundred five alcohol injections were administered in the series of 318 patients, which is an average of 2.5 injections for each patient. During the course of the treatment, either at the clinic or elsewhere, there were 17 drainages of the antrum, 71 extractions of teeth, 11 nasal operations, 11 maxillary operations, and 93 nerve avulsions, a total of 203 palliative operations in addition to the 805 alcohol injections.

Ninety-five of the 318 patients had radical operations, 9 ganglionectomies, 4 removal of gasserian ganglion tumors, 49 avulsions or resection of the posterior root, and the posterior root was cut in 33. Five were re-operated for trifacial neuralgia, probably not because of regeneration of the posterior root, but because a complete division of the root was not effected at the primary operation. Four patients died, 2 from hemorrhages, 1 from meningitis, and 1 from exhaustion and senility, as there was no evidence of meningitis or hemorrhage.

Operations on the gasserian ganglion have been attended with serious hemorrhages, paralyses of the third, fourth, and sixth cranial nerves with occasional involvement of the whole seventh nerve, ankylosis of the jaw, and trophic interstitial keratitis. However, improvement in the methods of surgical technic, with the introduction of specially devised instruments for ligation of the middle meningeal

and a ganglion retractor, equipped with a small light, as well as the use of small dental packs in dissecting the dura, has permitted a more careful dissection and made the control of hemorrhages less difficult. By holding the dura taut and not resting the ganglion retractor on the cavernous sinus, paralysis of the ocular muscles has been avoided. The frontal branch of the seventh nerve is left uninjured by making the skin incision 3 cm. posterior to the external angle of the orbit. By cutting the posterior root instead of avulsing it, thus preventing injury to the pons (Adson), and by not stripping the dura over the petrous bone, paralysis of the seventh nerve has also been lessened. Since the adoption of Frazier's incision, instead of the Hartley-Krause incision, in which the temporal muscle is split instead of incised, ankylosis of the jaw is rarely a complication. The occurrence of trophic interstitial keratitis has also been greatly lessened since the dura propria is not opened except over the posterior root where the fibers are cut, thus eliminating extensive exposure of the ganglion and avoiding injury to the ophthalmic portion of the ganglion, which either has a trophic supply to the cornea or sympathetic communications with the carotid plexus that protect the cornea against slight abrasions and ordinary irritations.

Operation

The patient is placed in a semi-erect position with the head on a special headrest which may be raised or lowered to the position desired. A general anesthetic is used. The anterior limb of the question mark incision over the temporal region and down in front of the ear to the zygoma begins 3 cm. posterior to the external angle of the orbit and 3 cm. above a line drawn parallel with the zygoma. The temporal muscle is split and the skull exposed by a mastoid retractor. A subtemporal decompression is done, and an area of bone about 3 cm. by 3 cm. is removed. The dura is gently elevated from the middle fossa until the meningeal artery, which we prefer to ligate, is exposed. The foramen is plugged with bone wax; this is followed by further elevation of the dura until the posterior margin of the third branch appears. Dissection is then carried posteriorly and inward, exposing only the posterior margin

of the ganglion. The dura propria is not opened until the region of the posterior root is reached; thus injury of the ganglion is avoided, particularly of the inner portion, the cells of which control the ophthalmic branch. Before the dura propria is opened directly over the posterior root all bleeding is controlled. The dura covering the brain is held under gentle tension and the cavity is well illuminated by means of the ganglion retractor. After the dura has been opened, the fibers of the posterior root are gently exposed and slightly elevated, and the guillotine knife is slipped over the fibers which are to be cut; thus any trauma to the pons or brain stem is avoided. The cavernous sinus is rarely injured, inasmuch as all the anatomic marks may be seen clearly. The fibers of the posterior root just above the ganglion are turned down over the ganglion while the proximal fibers are pushed back into the posterior fossa. A small pledget of muscle is inserted into the dural foramen as a plug; this assists in making a barrier between the severed ends and prevents the extensive loss of cerebrospinal fluid that usually follows the patient's recovery from the anesthetic. If there is any danger of bleeding, it is well to insert a narrow strip of iodoform gauze, and remove it on the third day. The muscle and fascia are closed with interrupted sutures of chromic catgut No. 1. The edges of the skin are approximated with interrupted sutures of silk which are removed on the fifth day. During the operation the eyelid is covered with adhesive which is replaced by a Buller's shield before the patient leaves the operating room. The shield is worn for a week or ten days and subsequently is exchanged for close fitting automobile goggles, to be used whenever the patient is exposed to wind or dust. In addition to wearing goggles, irrigations twice daily with a 2 per cent boric acid solution are advised.

Summary

Eight hundred five alcohol injections have been administered in the series of 318 patients in addition to 203 other palliative operations, making a total of 1,008 palliative surgical treatments. Ninety patients have had the radical operation with complete relief, the remaining 228 are still seeking relief by temporary methods.

Having personally divided the posterior root in 74 cases of trifacial neuralgia, I am convinced that the radical operation is indicated in operable cases after one or two alcohol injections, in preference to continuing the palliative procedures indefinitely.

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DISCUSSION

DR. CHARLES R. BALL, St. Paul: In the beginning, I wish to say just a word or two with reference to trifacial neuralgia and focal infection. In a very intimate acquaintanceship with this subject extending over thirteen years. I have not seen one case which has been benefitted by treatment directed towards the removal of focal infection. Usually, these cases are like most other cases I get. Before they go to the neurologist they have gone the rounds, their teeth have been extracted, and the palliative procedures which Dr. Adson has spoken of have been done. In some cases the entire jaw bone has been removed, and finally in desperation they consult the neurologist.

In regard to the etiology, we have not been able to solve the mystery of the etiology of this disease, but there are cases of what might be termed irregular atypical cases which go a long way towards giving us an angle of what the source of the trouble is. The idea that it is not a disease due to extraneous irritations, that it is not exogenous in nature, that it is endogenous, that it is a disease per se, seems at the present time to be the consensus of medical opinion. In these bizarre cases we find a symptomatology different from what it is in the typical cases, especially with regard to the nature of the pain. We always hear a trifacial neuralgia spoken of as being a lightning pain, agonizing pain, jabbing pain, burning pain, with a free interval, and then another pain, the pain lasting for a second or two, and the interval so short that the pain seems almost continuous, but if one inquires carefully there is a free interval.

This spring I had an unusual case of what I thought was trifacial neuralgia in a young woman. She was thirty-two years of age at that time, and the neuralgia began ten years ago. It seemed to me intimately related to her period of menstruation, and after she had had about six or eight weeks of pain which came in definite attacks, the pain always

stopped with the ending of menstruation, and two or three days before she could usually tell when it was going to disappear. After she was having pain and became pregnant, the pain always stopped during pregnancy, and she remained free from pain during the entire period, and then after her delivery, she started again with her pain. When I saw her she was having pain once every hour with the precision of clockwork. This pain would come in attacks lasting fifteen minutes in duration by the watch, and then she would have a free interval, and so on. Before she began to have trifacial neuralgia she had had a typical migraine headache. Since the beginning of the neuralgia the headache had disappeared. I relate this case because of its atypical character and because, it seems to me, to help point the way toward the etiology of the disease, and I think we should not seek it in focal infections but should regard it as a disease per se.

With reference to the method of dealing with it, I condemn just as Dr. Adson does palliative operations, such as evulsion of the nerve at the infraorbital and supraorbital margins, because these operations are always disfiguring; they make further treatment more difficult, and are exceedingly temporary in character.

We have then, two lines of treatment to consider. The first is the alcoholic injections, and the second a radical operation. In considering a radical operation we have got to consider that some things have changed.

Several weeks ago I went on a fishing trip and took my automobile. I got up in the morning, took my automobile, and drove seventy miles to a trout stream, arriving there about eight o'clock. Twenty years ago I would have been crazy to have considered making a trip of seventy miles, getting up early in the morning and being at the trout stream at eight o'clock.

The neurological surgeon is seeing improved technic in his work. The radical operation now is an entirely different proposition from what it was five years ago, and in considering it you must take that fact into consideration. Dr. Adson has been one of the men who has helped to develop this operation, and I agree with him in every particular.

In deciding for your patient what procedure you are going to recommend, you must bring great stress to bear on the fact that the neurological surgeon has improved in his work, and you must look at the matter in very much the same way that you would have regarded abdominal operations seventy years ago for an appendectomy or for excision of the gall-bladder. You would regard it now as a different thing altogether.

There are other factors that come in with reference to operation. I think first the alcoholic injections should be tried, and if they fail to give relief, or only give temporary relief, and have to be frequently repeated, other things being favorable a radical operation is the procedure to recommend.

In considering this operation one must remember the type of patient. I have found tic patients who have pain in the region of the ophthalmic branch are not favorable ones for successful alcoholic injections. Necessarily, in order to get this branch, you must go in through the eye and in going in through the eye it is a blind procedure, and every time I look at the position of the first branch of the nerve, where I expect to get it, and the optic nerve, I get the reverse because, it seems to me, that I would be just perhaps as apt to injure the optic nerve as I would the ophthalmic nerve. So if you get a severe trifacial neuralgia of the ophthalmic branch, a radical operation would be the most satisfactory. Then, you must take into consideration that this is still a major operation, and in selecting it for your patient you must consider whether the patient is in good general health and nutrition and has freedom from complications. Is the age of the patient such that you would feel like recommending any other radical operation? If you have a patient that will successfully withstand an excision of the gall-bladder, an appendectomy, or an operation for stone in the kidney, then you should have no hesitation in recommending this operation of evulsion of the fifth nerve in tic douloureux. If a patient is in the region of seventy or eighty years of age, and I had one case ninety years of age, a radical operation is not to be thought of.

The point I want to make is that the neurological surgeons, and Dr. Adson in particular, have so developed this operation that it can be done in many instances today where it would not have been attempted many years ago. Dr. Adson has made this operation safe and successful because he has developed the ways to do it. He showed the little retractors he has devised and which he uses in connection with the operation. I would commend these retractors to you; they enable him to go in there and light up the interior of the cavity so that he knows every step he is taking in the operation, whereas before it was more or less blind and obscured by the oozing.

DR. L. C. BACON, St. Paul: It has been my pleasure to see some of the admirable work done by Dr. Adson, and without any question most of these cases, particularly those of long standing, must be reached by these means.

I want to protest a little against the trend of the discussion of this subject insofar that we are advised by Dr. Ball not to waste time in looking for focal infection. We are all influenced by our personal experiences somewhat, and from two cases that have come under my observation, I think by all means in early cases we should look for focal infection. One of these cases I have had within two years. A man from the country came to me with a history of an abscessed tooth about seven or eight months before it was extracted. In two or three months after this time he began to have symptoms of this very distressing disease. The X-ray led us to

locate a small encapsulated pus containing cavity in the ramus of the lower jaw. For two or three months following the removal of that there was no particular subsidence of the disease, but within a year it had entirely cleared up.

One other case somewhat similar occurred five years ago, which makes me feel that we should look for focal infection. All of the causes of the disease we will not attempt to enumerate, but I am convinced from past experience with cases that there are infections of some sort back of it.

DR. W. L. BENEDICT: Dr. Adson has spoken of complications arising from extirpation of the ganglion and among these he mentioned trophic keratitis. It has been my privilege to see nearly all of the persons on whom Dr. Adson has performed this operation; complications in the eyes have followed in five. Four of these occurred in persons who were operated on before 1918, and one following an operation this year.

The keratitis that follows extirpation of the ganglion in these cases is not typical of trophic keratitis and should not be so classed. All the patients who have been referred to the Section on Ophthalmology following this operation showed an abrasion of the epithelium, usually in the lower part of the cornea. The abrasion of the epithelium appears first; the injection of the conjunctiva and the infiltration of the cornea follow.

It is now customary to protect the eyes of the patient from injury during operation. The patients are also advised to wear a special type of goggle for several months after the operation. We believe this protection is important because after extirpation of the ganglion, corneal ulcers do not yield readily to treatment. By affording better protection to the eye from injury, we may eliminate keratitis as a danger or complication of this operation.

DR. EDWARD J. BROWN, Minneapolis: I understand Dr. Ball to say that he had seen no benefit from the removal of focal infection. I remember two cases in which I was able to give the patients very decided temporary relief by such treatment. One patient was an old man, eighty-two years of age, by the name of Fish whom Dr. Ball will perhaps remember as under treatment for some little time, and I was able to give him marked relief by washing out his left antrum. At the time he disappeared, and a good many months later returned saying Dr. Ball had permanently cured his trifacial neuralgia by the injection of alcohol. That was not, however, entirely permanent. Later he returned to me and I gave him more or less relief by cleaning out the antrum.

I have had another case in a man over sixty years of age, in the last few years, to whom I gave very marked relief by opening up and cleaning out the right antrum. The pain was chiefly in the side of the nose and lip. I also injected the infraorbital nerve. He was given marked relief, but it was not permanent. He came back again after about a year when the treatment was repeated. I have not seen

him since then, and perhaps he has gone to Dr. Ball.

PROTEIN SENSITIZATION IN ASTHMA AND HAY FEVER*

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A study of protein sensitization as a cause of asthma was undertaken two years ago by Dr. Fricke-Davis, a Fellow on the Mayo Foundation. Her investigations are still in progress and the complete report and analysis of these cases will be reserved until some future time. The present clinical report, then, may be considered only as preliminary and as intended to serve merely as a guide to the study of cases of this type.

The subject of protein sensitization in asthma and hay fever has received consideration at the hands of many investigators during the past few years. However, our work has followed chiefly that done at the Peter Bent-Brigham Hospital, Boston, by Walker and his co-workers, June Adkinson and Wodehouse, who have made a thorough and exhaustive study of the causes of bronchial asthma.

About twenty-five papers have been published by this group of investigators. Nineteen have appeared as studies. Studies I, II, and XIX deal with the organisms found in sputum of asthmatics. Study III deals with the evidence of sensitization to the bacterial proteins, as demonstrated by skin reactions. Study XIII, by Walker and Adkinson, is on the relation between the cutaneous reactions, serum agglutination tests, and bacterial examinations of the sputum and nasal secretions in determining what part organisms have to do with bronchial asthma. Study XV is on the treatment of such patients with vaccines made from these organisms. Studies IV, VI, VII, and VIII cover the findings in patients sensitive to animal emanations, the serum, dander, and hair of the horse, and the hair of the cat and dog. Studies V and IX deal with the proteins found in various cereals and their relations to asthma. Study X takes up the sensitization of patients

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with bronchial asthma to the proteins of animal, fruit, and vegetable foods. Study XVI considers more specifically the proteins found in the different parts of plants and the individual proteins of cereals. Study XI deals with the important subject of the relation of pollens to bronchial asthma. Study XIV is on the treatment of patients by subcutaneous injections of the proteins to which they are sensitive. Study XIX has just appeared and concerns the types of streptococci found in asthmatics' sputum. Beside these more fundamental studies there have been interesting reports in studies XII, XVII, and XVIII. In one of these, study XII, Walker concludes that complement fixation and precipitin reactions, using proteins to which the patient is sensitive as antigens, have no value in diagnosis, prognosis or treatment in comparison with the great value of the cutaneous reaction. In study XVII comparison is made between the cutaneous and intradermal methods of applying tests; the results are decidedly in favor of the cutaneous method. The conclusion is that the skin test is specific and separates closely related proteins, that it is sufficiently sensitive and yet not too sensitive. It is a safe index to proper treatment. Treatment gradually decreases the positiveness of the reaction. The cutaneous manner of making the test is easy and does not inconvenience the patient. The intradermal test is much less specific and much too sensitive and cannot be an index to proper treatment. It is more difficult to perform and causes the patient considerable annoyance and discomfort. Study XVIII is on the relation of eczema, urticaria, and angioneurotic edema to proteins other than those derived from food. Walker brings out the fact that horse dander, ragweed pollen, or other pollens may be responsible for an eczema or urticaria associated with asthma, and that these patients are very difficult to treat in an effort to desensitize, as very small doses may greatly aggravate the skin condition. The papers other than the "Studies" that have been published cover very fully the matter of technique and preparation of the test substances, the classification of asthma, and the mode and results of treatment.

In several published papers,^{19, 20, 21} Walker has classified bronchial asthma into the anaphy-

lactic type and into the non-anaphylactic type. In the sensitive type are grouped those persons who have asthma during the entire year, due to the proteins of animal emanations, foods, or bacteria, and those who have symptoms only at certain seasons of the year, due to the pollens that are flying at that particular time. In the non-anaphylactic type, whether the asthma continues throughout the year or comes only at certain seasons, the cause is attributed solely to bacteria.

Sex, nationality, and occupation play little part in the factor of sensitization, with the possible exception that bakers are a little more sensitive to the pollens of flour than other persons, and that asthma due to horse dander is more noticeable in those who come in contact with horses, such as farmers and teamsters.

Age is an important factor in the consideration of the patient's history. In persons past forty it is very rare, indeed, to find that protein sensitization is concerned in their asthmatic trouble. The highest sensitiveness in Walker's series was found in 90 per cent, or twenty-seven of thirty patients between the ages of two and five*.

The preparation of proteins in anything approaching a pure state is a chemical procedure more laborious than is advisable to be undertaken in the average physician's laboratory. The gathering of the pollen is also a somewhat tedious process and necessitates preparation of extracts months in advance of the time of use. For this reason, doubtless, many physicians have believed that while there is much to be learned by this method of testing patients it is beyond the power of the general practitioner to carry out such diagnostic measures. Recently, however, a complete list of proteins ready for use as test substances has been placed on the market, and it is with these that most of our tests were made. The substances are prepared under the direction of Wodehouse so that their reliability is without question.

The technic of the test is exceedingly simple. The patient's forearm is cleaned with soap and water, or alcohol. The skin is wiped dry. A number of abrasions are made through the epidermis with a small scalpel or chisel such as is used in making a von Pirquet test. These abrasions are usually placed five or six in rows.

In this way fifteen or eighteen or even twenty-four substances may be tested on one arm, or if a large list of substances is used, both forearms may be covered. Tenth normal sodium hydroxide is a solvent for all the proteins that come in dry form. A drop of this is placed on the abrasion with a wooden applicator and some of the dry protein is removed with the same applicator and mixed with the solution on the abrasion. It is necessary to use only a small quantity of the protein substance. A new applicator, of course, must be used for every protein. Care must be taken that the protein from one abrasion does not in any way come in contact with another spot on the skin. Usually one of the abrasions is treated merely with the tenth normal sodium hydroxide for a control. Thirty minutes, as a rule, will complete a test. Often in a very few minutes a reaction will be noticed by the appearance of an urticarial wheal, about one-half centimeter in diameter, with an erythema several centimeters across surrounding the central white zone.

We have used, routinely, a rather large list of proteins of the animal emanations, horse dander, horse serum, cat hair, dog hair, and chicken feathers. Of the foods we have used the proteins of meats, cereals, nuts, seeds, and fruits, vegetable and animal foods, milk and eggs. In the list of meats, proteins were derived from beef, pork, chicken, salmon, veal, lamb, lobster, clam, and cod-fish. Milk proteins were whole milk, casein, and lactalbumin. Egg proteins were from the whole egg, egg white, and egg yolk. The proteins of grain in our list included those from wheat, sub-divided into protein of the whole wheat, wheat proteose, wheat glutenin, and gliadin. The difference in these proteins and their specificity of action is taken up in detail in Study IX by Wodehouse. Beside the wheat proteins, tests were made with rye, corn, oats, barley, rice, buckwheat, and flax; among the seeds, beans and peas were the most important, and among the nuts, walnuts, almonds, brazil-nuts, and peanuts. The vegetable foods, including radish, cabbage, carrot, squash, lettuce, turnip, potato, tomato, onion, asparagus, cucumber, rhubarb, and spinach yielded negative results, for the most part. The fruit proteins used were banana, grapefruit, strawberry, and cantaloupe.

Probably the most important group of test substances are the dried pollens. Those in our list are the pollens of ragweed, goldenrod, sunflower, daisy, orchard grass, timothy, red-top, meadow grass, sweet vernal grass, and lilac. We also used as test substances dried bacteria, *staphylococcus pyogenes aureus*, and *staphylococcus albus*.

Tests have been made in more than 800 of our cases during the past two years. At one time, a few patients were referred for the test on account of some skin condition, but as a rule no patient was tested unless he was suffering from asthma or hay fever. Of this number, more than 500 were entirely negative in their skin reaction. The reactions of about 100 more were doubtful and a more careful analysis of the history than is undertaken at this time would be necessary to prove that the reaction was of any worth in this group. The remaining patients, more than two hundred in number, had definite skin reactions. While the final study of these cases is to be undertaken by Dr. Fricke-Davis, a cursory review of the results at this time brings out some rather interesting data:

Twenty-eight persons reacted positively to some of the animal emanations. The largest number of reactions was to horse dander; thirteen have a definite history of being unable to go near horses without precipitating an asthmatic attack; four have urticaria, showing further symptoms of their anaphylactic condition. Two patients, entirely negative so far as they knew to the effect of animals on their asthmatic condition, lived on farms so that the history is somewhat doubtful. There were twelve doubtful cases in all; one of these is placed in this group because the asthma came on after the patient was 50, although he insists that he had not ever been able to handle horses. Four of this group affected by animal emanations were definitely sensitive to chicken feathers; one of these is also included in the group sensitive to horse dander. Three of the patients sensitive to chicken feathers might also be included among the food asthmatics, as they were extremely sensitive to egg white, egg yolk, and whole egg, and found it imperative to leave these substances out of their diet.

One hundred persons reacted to one or sev-

eral of the proteins derived from foods. Of the ten different proteins derived from meats which were used as test substances from six to three hundred fifty-five times there were very few positive reactions, thirty in all. In none of these could meat be definitely assumed to have any bearing on the condition, with the exception of the egg anaphylactic patients sensitive to chicken feathers who also, for the most part, could not eat the meat of chicken. The animal foods, milk and egg, were used hundreds of times and were positive only a few times. The greatest number of reactions was to egg white; eleven patients in all were sensitive to this protein. Whole egg and egg yolk were each positive six times. There were no reactions to whole milk; casein was positive only twice, and lactalbumin only three times. In fact, milk seemed to play no part in the asthma in children whom we saw.

Twenty-five patients had marked positive reactions to grain. Ten of these, however, must be considered doubtful, three because of their age, and the other seven because of the repeated attacks of bronchitis which made it seem that infection was probably the chief factor. There were, then, fifteen definite cases in this series. Three of these were of children whose food seemed to be the disturbing element. Two persons were very sensitive to flax; they are grouped here among the grain sensitive. The remaining persons gave histories which made it seem likely that they were sensitive to the proteins of cereal foods. Wheat protease is the most common offender of the cereal group, although rye may give as many reactions. Rice occasionally gives definite reactions. We had one domestic who was sensitive to the whole group and found difficulty in eating "war bread" and in handling the ingredients for making it.

There was a large number of patients, twenty-eight in all, sensitive to vegetable proteins. This group on the whole is negative; Wodehouse pointed out in one of his papers that there is very little protein matter in vegetables, except in roots and tubers. Potato contains a considerable amount of protein. Two persons were probably affected by this substance. One man in particular was reported as being mark-

edly improved for months by leaving potato out of his diet.

Fruits, apparently, have little to do with asthma. In several instances banana gave marked reactions. Twice it was known to be a definite factor in producing asthma. One history was most interesting. This patient was seen five years before the present technic was in vogue. A crude method of testing her sensitivity to this food was tried. An extract was made and what was thought to be a small dose was injected intradermally. A similar extract of raw potato was used as a control. In fifteen minutes the patient developed an urticarial wheal as large as a dollar about the site of the injection of banana extract and simultaneously became afflicted with a most severe attack of asthma. This left no doubt about the patient's having anaphylaxis for this fruit.

In three hundred sixty-five tests to *staphylococcus pyogenes aureus* and *staphylococcus albus* there was not a single reaction. This is at variance with Walker's findings¹⁵. Specific strains probably should be used instead of stock strains as test substances. Among the large number of negative results that we have obtained, infections surely play a large part in the cause of this respiratory affliction.

Because of the very definite results obtained the most interesting group is made up of those persons sensitive to pollens. As is known by the profession generally and also by the laity, ragweed pollen is a definite cause for so-called "hay fever." This has been facetiously termed "a rich man's disease," as change of climate is the popular method of treating the affliction. Probably the most serious factor in hay fever is the tendency for the patients ultimately to develop asthma. It must be remembered that all seasonal coryzas are not of necessity hay fever. In fact, there is doubtless a large proportion of "colds" of an epidemic nature during the hay fever season that may be mistaken for this specific anaphylactic disease. Twenty-two patients in our group were sensitive to no pollens but ragweed; four of these were doubtful cases, twelve had hay fever only, while six had hay fever and asthma. We had one patient who was sensitive only to the pollen of goldenrod. This probably was not a definite reaction as

her hay fever was contracted in India and she knew positively that the dahlias growing wild on the hillsides were the offenders. Goldenrod when it reacts probably is an evidence of a group reaction rather than a specific cause of the trouble. Goldenrod was coupled with ragweed in sixteen other cases. Only one of these need be considered as doubtful. Eight had hay fever alone while seven had both hay fever and asthma. The history of these sixteen patients with positive reactions pointed chiefly to ragweed as the cause. Two of the patients of the series also had an urticaria complicating their sensitive condition.

Beside the group just mentioned there were thirty-one other patients sensitive to ragweed in addition to other substances; eleven of these were doubtful; and one of these classified as doubtful while probably sensitive to ragweed as a cause for hay fever, was proved to be sensitive to an insect powder manufactured by a concern of which he was the sales manager. Contact with the powder in the factory precipitated his attacks of asthma, and his skin was markedly sensitive to the substance which was not irritating to a normal epidermis. The remaining nineteen patients at all sensitive to other substances were undoubtedly afflicted chiefly by ragweed.

In summary of the groups sensitive to ragweed and other fall pollens fifty-two cases, in all, were definitely positive, thirty-six with hay fever and sixteen with both hay fever and asthma.

Twelve persons were sensitive to summer pollens. Eight of these patients had a definite summer hay fever beginning at the time that timothy pollenates. In two the histories were doubtful. In the other two the summer and fall pollens were both responsible so that the patients began in the summer with hay fever due to the timothy pollen and continued through until frost killed the ragweed.

The discussion of the treatment must be reserved for the later report by Dr. Fricke-Davis. Walker's reports on his own series are clear, however, and in the main the findings in our few cases are coincident with his statements. The persons sensitive to animal emanations become desensitized for a considerable period

by repeated injections of safe but increasingly large doses of the offending protein.

The cases of persons sensitive to food proteins are difficult to handle. Attempts to desensitize have not met with marked success, and careful elimination from the diet of the offending substances seems to be the chief method of control.

The persons sensitive to pollens offer more promise in the way of treatment. Desensitization as outlined by Walker in a recent paper may be carried out either before the season commences or during the season. By far the best method is to begin at least twelve weeks before the earliest date of pollination, starting with a dilution less than that which will give a positive skin reaction and gradually increasing the dose until a few tenths of one cubic centimeter of a 1 to 100 extract may be injected subcutaneously. Injections are given at weekly intervals so that a patient by beginning in May may receive twelve such injections before the advent of the autumnal hay fever season. If treatment is instituted during the season, great care must be taken or further reaction may follow. At times, asthmatic attacks may be relieved by such treatment, but results are not so satisfactory as with the pre-seasonal method. A very few patients have been treated at our hands by means of dilutions of the pollen extracts. The patients who have hay fever early in the summer who were so treated received no relief, possibly because treatment was not instituted until the season was advanced. Some half-dozen patients treated before the autumnal season have this year experienced marked relief from hay fever and one has escaped asthmatic attacks, that, too, in a season reported as being exceptionally rich in pollen.

In conclusion it may be said that in spite of the many negative tests that have been made in comparison with the small number of positive results, we still believe that there is something to be learned from this diagnostic method, and that more care in obtaining the patient's history and the careful selection of the type of case to be tested will result in less unnecessary work. It would not seem necessary to test persons to the proteins of the animal emanations unless there is a definite history suggesting an asthma due to this type

of sensitization. The tests are sharp and the number of persons in this group is very small. It would seem unnecessary to use a large number of food proteins in testing asthmatics. A few of the cereals and potato as the chief vegetable would include practically all the food proteins that would react positively in a routine examination of asthmatics. The persons sensitive to pollen form the largest group prominent for positive reactions and their histories will practically always decide the type of person who is to be tested to the extracts of the various weed pollens.

It should not be forgotten that asthma that develops after the age of 40 is very seldom due to a protein sensitization. A very large group of asthmatics remains in whom the subject of infections should be considered most carefully.

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PROTEIN SENSITIZATION IN BRONCHIAL ASTHMA AND HAY-FEVER*

By CHAS. N. HENSEL, M. D.
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Up to five years ago the Medical Profession was without any adequate scientific conception of the etiology of asthma. Today, in the theory of protein sensitization as applied to asthma, we have a definite etiological classification in approximately fifty per cent of the cases seen clinically in practice. And with the skin test, of which we will later speak in detail, we have an adequate procedure which not only removes the diagnosis from the field of chance, but shows accurately the degree of sensitization and points the way to definite progressive treatment.

Hay fever had received a great deal of scientific study. Dunbar, in 1903, determined that the hay fever in Europe was dependent chiefly upon a protein substance found in the pollen of most grasses, while in America it was due chiefly to the pollen protein in the composite family of which ragweed was the chief offender.

It was Wolff-Eisner, in 1906, who first called attention to the fact that the disease was due to the anaphylactic action of these pollen proteins upon hypersusceptible individuals.

Dunbar believes this but, in addition, thinks there must be an abnormal penetrability of the skin and mucous membranes for the pollen substances. He has shown that a solution of pollen toxin dropped into the eye or upon the skin of

a hay fever patient produces a severe reaction, while in normal individuals no such reaction occurs.

In 1911 Noon, and later Freeman, in England found timothy pollen as a cause of hay fever in a majority of cases and had some success in treating with timothy pollen toxin.

Goodale of Boston, in 1914, extended these observations to cover a wide range of plant pollens, from those of trees flowering early in the spring to the roadside plants blooming late in the fall.

While he found a scattering sensitization to almost every variety of pollen, his important results were that timothy and June grass pollen caused the majority of the early summer cases of hay fever while ragweed was responsible for the majority of the cases occurring in the late summer and fall.

Instead of using the ophthalmo-reaction of the earlier investigators, Goodale applied the cutaneous method so well known in the diagnosis of tuberculosis. This procedure permitted a number of determinations to be carried out at one time as well as being more acceptable to the patient.

This historical review brings us up to the work of Walker which commenced sometime in 1915. His studies covered both hay fever and asthma and he has expanded and amplified our knowledge very materially.

Much of what I shall have to say in the balance of this paper is based on Walker's work plus three years' experience of my own.

Method of Procedure

Vaughan has shown that when a foreign protein enters the body parenterally, i. e., outside the digestive canal, it stimulates the body cells and they produce specific proteolytic ferments which will digest this protein; when this has occurred the body is sensitized to the foreign protein. When this foreign protein is again introduced into the body the specific proteolytic ferments proceed to split it up, liberating a non-poisonous and a poisonous molecule. It is these poisonous molecules accumulating too rapidly for absorption that causes the anaphylactic phenomena.

Since it is agreed that it is the protein element when parenterally introduced which

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causes the state of sensitization, and since proteins are widely distributed in nature, we must not be surprised to find these proteins coming from many different sources and entering the body in different ways.

The proteins may enter the body chiefly then through three different channels, i. e., inhalation, ingestion, and infection. In the inhalation type there are four sources, namely—

1. animal hair and dandruff
2. pollens
3. flour—bakeries and mills
4. dust—coffee roasting

In the ingestion type there is but one source, namely, food. The chief food offenders in order of importance are—

1. cereals—wheat, corn, rice, rye.
2. eggs.
3. fish—lobster, salmon, mackerel, cod.
4. casein.
5. beef.
6. chicken.
7. cocoa.

In infection we have as a cause autolysis of bacterial proteids coming from any septic focus in the body such as respiratory infection, foci in sinuses, tonsils, teeth, gall bladder or elsewhere in the gastro-intestinal tract.

Walker's percentage of the various causative factors is interesting in this connection. He found of all the asthmatics who proved sensitive, 20 per cent were sensitive to horse dandruff, 15 per cent to wheat, 15 per cent to staphylococcus pyogenus aureus, 15 per cent of early pollens, 10 per cent to late pollens, 5 per cent to cat hair, 3 per cent to staphylococcus pyogenus albus, and 17 per cent to miscellaneous proteins.

Technic of Skin Tests

A number of small cuts $\frac{1}{8}$ of an inch long are made on the flexor surface of the forearm with a sharp scalpel, not deep enough to draw the blood yet deep enough to penetrate the skin. A sufficient number is made at one time for all of the proteins to be tested, and an extra one allowed for a control. On each cut is placed the protein to be tested and to this is added 1 drop of 1/10 normal KOH solution to dissolve the protein and permit its rapid absorption. At the end of a half hour the proteins are washed off and the reactions are

noted, always comparing the inoculated cuts with the normal control on which only KOH solution was placed.

A positive skin test consists of a raised white elevation or urticarial wheal surrounding the cut with a small or large zone of hyperemia extending beyond the elevation. Sometimes there may be a good sized area of hyperemia without any elevation of the skin. Often there is considerable itching of the skin.

The smallest reaction that can be called positive must measure 0.5 cm. in diameter and any smaller reactions are called doubtful. It some times happens that all of the cuts, even the control, may show a slightly positive or plus-minus reaction. This is especially true in cases of long standing and in middle aged individuals with chronic bronchitis and bronchiectasis. Consider these cases all negative.

A negative skin test with a certain protein rules out that protein as a cause of the asthma or hay fever, and, conversely, all proteins which give a positive skin test should be suspected as causative factors.

As pointed out earlier in the paper, these reactions are absolutely specific. A patient who is sensitized to the protein of horse hair and dander will not react to the wheat protein and vice versa; also as long as this patient is sensitive to horse dander he will always give a positive skin reaction to horse dander.

Scheme of Determining Causative Agent

When an individual comes to you complaining of asthma or hay fever ask him when he has it. If he replies that it is strictly seasonal we infer that it is probably due to some of the pollens. If this season be early summer it is due probably to the pollen of timothy or red-top grass and we make the tests with these. If the season be the late summer and early fall the sensitization probably is due to ragweed pollen. The ragweed season in this section of the country commences about the 10th to 15th of August and lasts until frost. The date of onset varies with the condition of the season. This fall type is also caused occasionally by the pollen of goldenrod, golden glow, sunflower and daisy, but these all belong to a compositae class and skin tests with ragweed usually suffice.

Next inquire into the relationship that colds

and respiratory infections bear to the onset of the symptoms. If a close relationship exists, disregard the inhalation and ingestion types and look for bacterial causes in the sputum and nasal secretions. This type is likely to occur in the spring and fall during the wet changeable weather. These cases usually respond to autogenous sputum vaccines which either contain *staphylococcus pyogenes aureus*, occasionally *albus*, or the diphtheroids.

If the investigation is so far negative inquire whether the symptoms are more or less constant throughout the year. If this be admitted, consider the possibility of the protein being in the form of some emanation from the domestic animals, i. e., hair and dandruff of horse, dog or cat, the dust from chicken feathers or the dust from woolen blankets and pillows. Walker had one case due to sleeping on a feather bed and two cases from sleeping on feather pillows.

If we get an admission of this type we make the tests with alcoholic extracts of horse, dog, or cat-dander, chicken feathers or wool.

Our next inquiry is as to the relationship of the asthmatic attacks to the ingestion of food. This food type occurs usually in younger people and in them one usually gets a history of eczema; therefore, if your patient has eczema be sure to investigate the foods. Many of these food cases have a natural unexplained dislike for certain foods or else know definitely that certain foods cause the attacks. This is particularly true of eggs.

According to Walker one-half of the food cases are sensitive to protein in cereals, and of these, wheat is the chief offender causing probably 70 per cent of all the asthma due to cereals. Corn, rye and rice scattered along make up the balance. Eggs are next to wheat in importance. Then comes fish, of which lobster and salmon are the usual sensitizing substances. Potatoes are quite often a cause; and at the end of the list we find milk, beef, chicken and cocoa. There have been some cases reported as sensitive to grapenuts—again a cereal. If all of these are negative it is unlikely that the other more occasional articles of diet are causative factors.

Talbot has shown a few cases of asthma in children as due to the protein of different nuts,

but his chief findings were egg albumen in the majority of cases, with cereals second and milk third.

If all of the above causes have been investigated and been found negative then look for some source of chronic infection, i. e., sinusitis, septic tonsils, pyorrhoea and abscessed teeth, or any infection along the gastro-intestinal tract.

If the patient states that his asthma began after the age of 40 he is usually not sensitive to anything. These are cases of cardiac asthma, cardiorenal disease and aneurysm of the aortic arch, chronic bronchitis and bronchiectasis. If you can get some of the sputum from these latter cases and make a vaccine from the predominating organisms present and treat with this vaccine plus the giving of KI, you may get improvement, but these are usually very unsatisfactory cases to handle and are much more comfortable in a warm, dry, equable climate.

In contrast to the older cases just referred to, the younger patients are much more likely to show sensitization to some protein, and in consequence the treatment is more often beneficial.

Up to five years of age, roughly 90 per cent are found to be sensitive to some foreign protein. This proportion decreases gradually until with cases beginning after 35 years only 23 per cent were positive to foreign protein.

Multiple Sensitization.

Multiple sensitization appears to be much more common in those who began having asthma during infancy and up to 10 years of age. If the onset occurred after the age of 10 multiple sensitization is quite rare. It follows apparently that sensitization to one protein early in life is apt to increase foreign protein sensibility and the patient acquires sensitization to other proteins as well. As an example we find a patient sensitive to several foods, to horse dandruffs and to pollens.

In handling these cases of multiple sensitization the best plan is to omit all foods giving positive reaction for at least one month, believing that total abstinence from the offending protein for a long period automatically desensitizes for that protein. In addition, de-

sensitize with horse dandruff protein and also pollen protein.

Methods of Preparing Proteins for Tests.

A handful of uncleaned horse-, dog-, or cat-hair mixed with dander is put into a bottle of 12 per cent alcohol, corked and left from 3 to 4 days. The alcohol serves to sterilize the solution and extract the protein. This solution is filtered and kept corked in brown bottles for the tests.

Crude pollen extracts can be made in the same way by soaking the blossoms containing the pollen in a 12 per cent alcoholic solution, though now a number of commercial houses are placing pollen extracts on the market for skin tests as well as for treatment.

The foods can be applied to the skin in the form in which they are consumed, i. e., a little beef juice, a little of the juice squeezed from canned salmon, the white of an egg, a little juice scraped from the cut surface of a potato either raw or cooked, a drop of milk applied to the scratch. The cereals may be applied in the form of flour moistened with a drop of 1/10 normal KOH since most cereal proteins are both water soluble and alkali soluble.

Walker says that many patients who are sensitive to wheat will not react to the crude flour test but have to be tested with the individual proteins extracted from the wheat, such as globulin, leucosin, glutenin, gliadin, etc. My own experience has borne this out, but so far I have not had the individual proteins available for tests though I have a number of cases that showed a definite reaction to the crude flour tests and were apparently relieved by withdrawal of that food from the diet. One or two of the chemical houses are beginning to put these proteins on the market.

The bacterial proteins are obtained by growing on agar, washing, centrifugalizing with saline, then 3 per cent phenol in absolute alcohol and finally with ether, leaving a dry powder for tests.

Treatment.

For the bacterial causes, remove foci of infection and treat with autogenous or stock vaccines, beginning with a small dose, i. e., one hundred million and increasing gradually, i. e., fifty million at 7- to 10-day intervals.

For food causes, remove the food from the diet. Desensitization has been tried and is very unsatisfactory. Heating to the ordinary cooking temperatures and prolonged boiling do not destroy the anaphylactogenic properties of wheat. But, as shown by Wodehouse, the extraordinarily high temperatures employed in making the prepared cereal foods such as "puffed wheat", "puffed rice," "Kellogg's Toasted Wheat Biscuit," "Shredded Wheat," etc. seem to render these cereals harmless. Consequently these cereals may be allowed in the diet in this form in sensitive cases who cannot take them in any other form.

For animal emanations, give away the dog and cat, get rid of the feather beds, avoid horses if possible; if not, desensitize.

There are two proteins in horse dandruff—the alkali meta-protein and the peptone. Different individuals vary widely in their sensitivity to these two proteins so that both must be used in testing, and treatment followed with the protein causing the severer reaction—usually the alkali meta-protein.

The horse dandruff proteins for treatment are made up in dilutions of from 1-100 up to 1-1,000,000. These various dilutions are placed on the skin cuts on the forearm and the character of the reaction noted for each dilution. Treatment is begun with the dilution just weaker than the one that gave the smallest positive reaction, gradually increasing the strength of the inoculations up to 1-100 dilution.

For the pollens, after having determined the particular pollen to which the patient is sensitive, we must begin treatment as in the horse cases, with the dilution weaker than the one to which the patient was sensitive and gradually increase the strength of the dilution at 5- to 7-day intervals, always avoiding a reaction, which delays the treatment and throws us back to a weaker dilution.

To give an illustrative scheme of treatment, we will suppose that the patient gives a more or less positive skin test with a 1-10,000 dilution. Then begin with a 1-100,000 dilution and give 0.2 cc.,
next 1-10,000 dilution give 0.2 cc., 0.3 cc., 0.4 cc.
next 1-5,000 dilution give 0.2 cc., 0.4 cc.,
next 1-1,000 dilution give 0.2cc., 0.3 cc., 0.4 cc.,

next 1-500 dilution give 0.2cc., 0.3 cc., 0.4 cc., next 1-100 dilution give 0.1 cc., 0.2 cc., 0.3 cc. Each dose to be given at weekly intervals and never oftener than every 5 days. This takes 15 treatments at 5-day intervals, which would necessitate 2½ months, so have your patient report at least three months before the expected onset of the season.

In conclusion, I wish to state definitely that the procedures above outlined reveal sensitization in only approximately 50 per cent of all cases of asthma tested. That those not found sensitive must be treated by the recognized standard-methods of proven clinical value.

As for those cases showing sensitization, satisfactory results have been obtained in my experience in a little over half the cases treated. Where desensitization has not been completely accomplished it has been of great value to the patient to know absolutely the source of this asthma so that he could avoid it.

Asthma patients associate their attacks with cold air, dampness, changeable weather, winds, menstruation, indigestion, nervous irritability, colds and bronchitis. After finding the offending protein and either removing it or treating with it, these patients become tolerant to these conditions and do not develop asthma when exposed to them.

Finally, I wish to express my obligation to Dr. Walker for advice, encouragement, personal communications over troublesome points as well as for furnishing test solutions from his own laboratory.

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(Discussion papers of Drs. Hensel and Sanford)

DR. H. L. ULRICH, Minneapolis: Mr. Chairman, Members of the Association: The subject of protein sensitization has such various aspects and presents so many differences to different observers that it is doubtful just where to begin in a discussion of the subject. One point to be emphasized is that these things must be considered as true anaphylactic phenomena. The manifestations are manifestations of a general susceptibility. This is not accepted by some observers because they have not been able to produce these phenomena in a passive way, such as we are able to do with an animal anaphylaxis.

In the last Journal of the A.M.A. there is the history of the transference of susceptibility to horse dandruff. A case of primary anemia was transfused with 600 c.c. of blood and two weeks afterward, while riding behind a horse, he suffered a severe attack of asthma. On going back to the donee they

found that he had suffered for years with asthma and that he was very susceptible to horse dandruff. That is an example of the practical transference of susceptibility.

The idea of testing out the skin reaction for bacterial reactions is not entirely new, although we owe a great deal of thanks to Walker for showing us these cases. Many years ago I reported to this Society the skin test for typhoid fever.

The point I wish to bring out is that in these diseases from the seventh to the tenth day you are liable to have skin reaction, and as the disease grows older you are liable to have more. In the cases reported by Cook and Van ? ? ? some years ago they showed that sixty to eighty per cent of the community are sensitized to foreign proteins and the common things are the focal infections found so frequently. I emphasized this last week that our focal infections are the common sources of these things, and this is pushing our clinical results nearer to the results we are looking for. We have bacterial infections and bacterial protein pathology and the common manifestations soon in our clinic are the protein manifestations. Most of the clinical cases—I have not proven it out, but feel sure that most of the clinical cases can be shown to be due to protein sensitization. Our urticarias, our pyloric spasms, our spastic constipation, our albuminurias, are all due to protein sensitization and to no other cause.

DR. W. W. HERRICK, Columbia University, New York: Mr. Chairman, Gentlemen and Ladies: It is a great privilege to be here with you members of the profession of Minnesota, and I thank you for allowing me to come.

This application of the phenomenon of Theobald Smith to practical clinical medicine has been one of the most recent developments to the general practitioner. There are two or three things which might be brought out. In the first place, where can one get standard proteins prepared in a scientific manner? I do not wish to seem to be an agent for any chemical house—I am not, but I do know that the work of the Arlington Chemical Company of Yonkers is on a very good basis and their products are worthy. The experts of this Company employ the simple incision rather than the ordinary von Pirquet test.

The examples which have come to my notice are those not only of the ordinary animal and food proteins, but of the feather proteins. My friend, Dr. Evans, of New York, was telling me of a consultation with another physician. The patient, a woman, had had asthma for eight years. During the consultation Dr. Evans heard a large parrot scream in the next room and he asked the woman how long she had had the bird. She said that she had had it for eight years. The idea occurred to Dr. Evans that the parrot might be the cause of the asthma. A test was given and a very pronounced reaction followed, and that did away with the parrot. Another case was that of canary birds. The patient had asthma

only in town and she had canary birds only in town. A test gave a very pronounced reaction to canary bird feathers. That shows how careful we have to be in testing for this protein sensitization. That is a very valuable work for the general practitioner and for all of us.

I regret that I did not come in in time to hear the entire discussion.

DR. ROOD TAYLOR, Minneapolis: Mr. Chairman, Gentlemen: In view of the statements that asthma which begins in early life shows a much larger proportion of protein sensitization, I looked over, yesterday, the record of twenty-five cases of hay fever and asthma in childhood, which have come to me this year. Sixty per cent of these began to have asthma before the second year, some before the third year and some before the sixth. Sixty per cent showed protein skin tests. Fully one-half of the cases were infections, following whooping cough, pneumonia, etc. The non-sensitization cases were quite definitely different from the sensitization cases. During the paroxysm there seems to be as much inspiration spasm as expiratory spasm, which is not so true of the protein cases which are usually of the purely expiratory type. There is a great difference also in the degree of eosinophilia in the sensitization and non-sensitization cases.

I would like to say a word about the case which Dr. Ulrich reported from the Journal of the A.M.A. In the last sentence of that report there was a statement that another case had been previously transfused by the same patient that was sensitive to the horse dandruff but had not suffered with any symptoms whatever.

DR. C. N. HENSEL, St. Paul (closing): Mr. Chairman, Ladies and Gentlemen: It has been a pleasure to hear Dr. Sanford's paper and to know that his experience parallels my own.

The thing of greatest value in this procedure is that it is a practical plan and easily put into operation. In the old days we thought these people were sensitive to chicken feathers, to milk and eggs, etc., but we did not definitely know. Now we can find out whether they are sensitive or not.

In the case of a doctor's child who had been taken off milk and eggs according to the customary teaching but continued to have attacks of asthma and be very thin and under-nourished, cutaneous tests showed that he was not sensitive to milk or eggs but was sensitive to horse dandruff. Milk and eggs were put back in his diet and he was desensitized to horse dandruff and is growing and developing into a healthy boy. Formerly he was so sensitive that if he bought peanuts from a horse-drawn peanut wagon he would have an attack of asthma.

As for foods, cocoa in my experience has been a more frequent cause than has been reported by Walker. Potato, too, is not an uncommon cause especially in adults, occasionally in children: I have had several cases who could not eat beef at all. A girl of eighteen who had had asthma since the age of

8 years and had been in the University Hospital repeatedly, had her sinuses washed out, turbinates trimmed, tonsils removed, etc. She would stay in the hospital a few weeks and be all right, but on going home the asthma would return. She got a good deal of benefit from calcium lactate, but even then would occasionally turn up with an attack of asthma. Then I tested her out, found that she was sensitive to beef and she has had only one attack of asthma since, and that followed eating a piece of beefsteak.

One patient who was supposed to have year-around hay fever was markedly sensitive to wheat, corn and rye, and slightly so to barley. Removal of these cereals from her diet caused the symptoms to disappear and she gained 15 pounds.

As for the grasses, timothy and red-top are the chief ones to consider. I have had only one case sensitive to goldenrod alone.

As to eosinophilia, I have asked the people at the Brigham Hospital and they say that in some non-sensitive cases they have obtained a typical eosinophilia, while in some sensitive cases it was absent. It is not always a factor.

The case of the sensitization to parrot feathers reported by Dr. Herrick is very interesting.

Walker reports the case of a woman sensitive to dog hair who refused to give up two pet lap dogs; he desensitized her and she kept her dogs.

DR. A. H. SANFORD, Rochester (closing): Mr. Chairman, Gentlemen: I do not know that there is much to add except to reiterate Dr. Hensel's statement that we are not justified in treating asthma empirically, and without first going into this subject as to whether the patient may not be sensitive to some specific protein. In hay fever I do not think it is justifiable to treat all hay fever patients in the same way. Even though the patient says he has hay fever, he should be treated with extracts and tested out until we find whether he is sensitive to the various things.

THE COLLOIDAL GOLD AND OTHER CEREBRO-SPINAL FLUID REACTIONS*

By CHARLES E. NIXON, M. D.
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The introduction of lumbar puncture into clinical use by Quinke in 1891 marked a very distinct advance in diagnosis, prognosis, and therapy. It is a relatively simple procedure, and harmful, or even unpleasant, effects rarely result from its employment if ordinary care and judgment are used.

Examination of the cerebrospinal fluid is

definitely indicated in cases where there is any suggestion of neurosyphilis, but it is of value, positively or negatively, in every neurologic condition.

Spinal puncture is contraindicated in cases of brain tumor, especially if the neoplasm is situated subtentorially.

At the time the fluid is withdrawn its color and pressure are noted. Normal cerebrospinal fluid is clear and colorless. In certain types of meningitis the fluid is cloudy; in cases with spinal cord compression the fluid may be yellow, with or without massive coagulation. After cerebral hemorrhage where blood has become mixed with cerebrospinal fluid, the fluid has a bright red color; later a yellowish discoloration occurs.

The pressure of the spinal fluid in normal individuals in the recumbent position varies from 40 to 90 mm. of water in a child and from 125 to 175 mm. in older children and adults.

Any pathologic process causing an increase in the production or a retardation of absorption of the fluid is accompanied by an elevation of the pressure. In the various forms of meningitis the pressure ranges from 300 to 800 mm. of water. Some increase of pressure is usually found in cases of cerebrospinal syphilis.

The tests that are of definite clinical value are the Wassermann complement fixation test, the Nonne or other tests for increased globulin or globulin and albumin, the cell count and the colloidal gold reaction. Of these, the colloidal gold test is the most valuable as the following comparative study of these reactions in various diseases will show.

In dementia paralytica a colloidal gold curve is obtained in at least 95 per cent of the cases; in untreated cases the reduction commonly occurs in zone I, giving a so-called "paretic curve."

The Wassermann test is positive in about 90 per cent of the cases and an increased globulin content is present in 85 per cent. A pleocytosis, that is, a cell count of six or more, is found in 70 to 75 per cent of the fluids from paretics. The average cell count in paresis is between 35 and 40 cells per cubic millimeter.

In tabes dorsalis the colloidal gold reaction is present much more frequently than any of the other tests. In about 10 per cent of the cases

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it is the only positive reaction. A curve is obtained in 80 per cent of the cases, whereas a positive Nonne and a pleocytosis occur in less than 50 per cent and a positive Wassermann in about 55 per cent of the fluids.

Well marked curves may be found in early cases. In patients with suggestive clinical evidence of tabes dorsalis but whose cerebrospinal fluid is entirely negative, a positive gold reaction is sometimes brought out by the administration of arsphenamine for several weeks accompanied by spinal drainage. In these cases the colloidal gold is the first reaction to appear.

The importance of the colloidal gold reaction in diagnosis is strikingly shown in a study of a series of fluids from patients with cerebrospinal syphilis; 85 per cent of the fluids gave some reduction, and 75 per cent showed definite curves. On the other hand, the Nonne reaction was positive in 63 per cent and definitely positive in only 41 per cent; there was a cell count above 5 in 45 per cent and above 9 in only 31 per cent. In 18 per cent of the cases the colloidal gold was the only reaction that gave evidence of a pathologic condition of the cerebrospinal fluid.

Of conditions other than neurosyphilis and meningitis giving a well marked curve, multiple sclerosis is the one most frequently met. About half of the fluids from cases of disseminated sclerosis gave a definite reduction. Many workers have reported curves in Zone I as being most frequent in these cases but our experience is that the reduction more commonly occurs in Zone II. The Nonne is positive in only a small percentage of the cases,—about 10 per cent in our series. The finding of an average cell count of 14 in multiple sclerosis, as against 1.6 in normal fluids, is interesting in that it tends to confirm the theory of a toxic etiology in this disease.

Fluids from patients with cord or brain tumor give a reduction in 50 to 60 per cent of the cases. The reduction commonly occurs in Zone III but is differentiated from meningitis by the fact that the Nonne is usually negative or faintly positive and the cell count is relatively low or normal, while in meningitis a strongly positive Nonne and a high cell count accompany the curve.

In considering the comparative worth of the

various tests used in the clinical study of the cerebrospinal fluid it must be borne in mind that each test depends on a different substance in the cerebrospinal fluid and is indicative of a more or less specific reaction on the part of certain tissues of the nervous system. While there tends to be a rather definite relationship between the fluid reactions in the various types of pathologic processes, it is not uncommon to find one or more of the tests positive with the others negative. For this reason a serious error in diagnosis may be made by failure to make use of all those tests in every spinal fluid studied.

These reactions are not specific in the sense that each denotes a definite etiological factor, for many conditions will cause increased globulin and albumin in the cerebrospinal fluid; the same is true of the varying degrees of pleocytosis. The terms applied to the colloidal gold curves, "paretic," "luetie," and "meningitic," indicate the belief that these curves are diagnostic of the conditions named; but the fact that so-called "paretic" curves and "luetie" curves are found in multiple sclerosis and other non-luetic lesions, and that a "meningitic" curve may be provoked by a tumor or myelitis, is proof that these reactions do not depend upon a single provoking substance. While emphasizing the non-specificity of the various colloidal gold curves, it is our experience that they are of very definite diagnostic value if corroborated by or corroborative of any other reactions or clinical findings; thus, a reduction in Zone I usually indicates dementia paralytica, in Zone II, cerebrospinal lues or tabes dorsalis, and in Zone III, meningitis.

It is apparent that a definite diagnosis should not be made upon the presence of one of these reactions; however, any distinct abnormality of the cerebrospinal fluid indicates a pathological condition of the central nervous system. Further, even a slight reduction of the colloidal gold is suggestive of involvement of the nervous system and a curve of any magnitude is definite indication of such a condition.

The spinal fluid tests are of relatively little value in indicating improvement of the patient under treatment, for the degree of reaction in these tests does not definitely parallel the clinical course. A fluid may be entirely negative or faintly positive at the beginning of treat-

ment and later show strongly positive reaction; at the same time the patient may give marked clinical evidence, subjectively and objectively, of betterment. The cell count varies from time to time with or without treatment and, in our experience, fluids showing pronounced colloidal gold curves do not change to any marked degree under treatment.

The colloidal gold reaction, while requiring a careful technique, has been simplified by careful workers until it is within the reach of any routine laboratory. It is unquestionably the most sensitive and valuable of the various tests used in the study of the spinal fluid. It does not take the place of any other test or make a careful neurologic examination unnecessary, but does have a definite and independent value and no examination of the spinal fluid is complete without it.

As Fildes, Parnell, and Maitland, and Wiles & Stokes have pointed out, the spinal fluid may give evidence of involvement of the central nervous system early in the course of the syphilitic infection. Since early treatment is of such vital importance in neurosyphilis, it is essential that every case of general syphilis, especially with any objective signs of nervous system involvement, should have a complete study of the spinal fluid together with a careful neurologic examination.

Summary

1. The colloidal gold is the most delicate of the routine spinal fluid reactions.
2. It does not replace any other test but, on the other hand, is of independent value.
3. It is of special importance in the early diagnosis of neurosyphilis.
4. The various curves are not specific but are of great diagnostic value in conjunction with other clinical and laboratory findings.
5. A colloidal gold curve may be obtained with or without other positive findings after provocative treatment.
6. The colloidal gold curve does not parallel clinical signs or give definite evidence of improvement under treatment.
7. Cases with no involvement of the central nervous system give no colloidal gold curve.
8. Clear cut clinical cases of tabes dorsalis may show all the spinal fluid reactions negative both before and after treatment.
9. A curve in Zone III with a negative cell count and negative or faintly positive globulin is strongly suggestive of a brain or cord tumor or myelitis.
10. Curves in Zones I and II may be found in non-luetic conditions such as multiple sclerosis and brain abscess.
11. A cell count above 5 is pathologic but this count is of no value in indicating duration or severity of the process or improvement.

*For a more complete treatise of this subject see "Colloidal Gold Reaction and Its Clinical Interpretation," by Warwick and Nixon, in Archives of Internal Medicine, February, 1920.

COLLOIDAL GOLD REACTION*

By MARGARET WARWICK, M. D.
Minneapolis, Minn.

It was not until 1912 that Lange first presented the colloidal gold reaction on spinal fluid. This has since borne his name as well as the more common term "gold-sol" reaction. In the comparatively short time which has elapsed since its advent, there has grown up on the subject a voluminous literature which has served to give the reaction a definite and well deserved place among the tests used as an aid in the diagnosis of affections of the central nervous system. Further elucidation or discussion of the test may serve not so much for its justification as for a wider interpretation and broader understanding of this reaction and its relation to clinical symptoms.

First of all in the study of any test, one must consider the allied reactions. For globulin the Nonne was most commonly used. This is done by mixing equal parts of saturated ammonium sulphate solution and spinal fluid. A white cloud or opalescence appearing in three minutes means an increase of globulin. More recently the Ross-Jones ring test, a modification of the Nonne, has also been employed. This consists of layering 1 cc. of spinal fluid upon 1 or 2 cc. of a saturated solution of ammonium sulphate. A white or grey ring marking the point of contact of the two fluids constitutes the positive reaction. This has proved in our hands to be the most satisfactory globulin test. It is sharp, clear cut, easily read and not often

*Read before the Minnesota State Medical Meeting, Oct. 1, 2, 3, 1919, Minneapolis, Minn.

confused with a slightly opaque containing tube as is the Nonne.

Text books and observers frequently differ as to the cell count to be considered as pathologic, the common view, however, being that any number below ten is normal. Many writers feel that this is too high a limit. In our series, there was not a single count of over five cells in a nonsyphilitic or non-neurological case and the average was 1.6 cells in our normal spinal fluids. From this fact as well as the findings of others, we believe that five should be the upper limit of the normal cell count.

But it is in the preparation of the colloidal gold solution that every laboratory worker, whether amateur or experienced comes to grief sooner or later. Most authors agree that a constant standard solution cannot always be made, and that skill consists in ability to recognize and remedy the faulty solution. After months of success, one is sometimes suddenly confronted by a so-called protected solution or more rarely, a hyper-active solution which gives the right curve, but produces it with unusual rapidity and exaggerated color changes.

All authors agree upon certain essentials for a successful solution. These are (1) perfectly clean hard glassware. (2) Water freshly double or more preferably triple distilled in a glass still having no rubber connections. (3) Chemically pure re-agents, preferably Merck's, dissolved in the water mentioned above. Our most satisfactory results have been obtained by rinsing all glass utensils with equal parts of concentrated HCl and HNO₃ taking care that no small area on the inner surface escapes the process. They are then placed under running tap water until all the acid is removed. This is then followed by a rapid rinsing first with ordinary distilled water and then with distilled spring water. If this procedure be carried out on new glassware, it need not be repeated as long as utensils are reserved for this use only, as simply rinsing them in distilled spring water cleanses them sufficiently for use. During the past few months, Jena glass has not been obtainable but American made glass has served just as well.

For the preparation of the reagent, 2000 cc flasks either the Erlenmeyer or round bottom, are found to be more satisfactory and more

easily handled than beakers. In our experience, the distilling of the water is the most important factor determining success or failure in making the solution. Any of the re-agents, if dissolved in improperly distilled water, will spoil any solution for which they are used, even if the bulk of the water be satisfactory. Frequent distillations of our tap water fail to give water which would produce a proper solution probably because of the chlorites added for the purpose of purification, which allow volatile chlorine to come over into each freshly distilled solution. On the other hand, single distillation of spring water sold for drinking purposes gave perfect results. All of the difficulties of preparation (usually resulting in the so-called protected solutions) in our laboratory have been directly traceable to the water.

All solutions of our re-agents were kept in stock and were made from Merck products and distilled spring water. The only method ever employed here is that of Miller, Brush, Hammers and Felton. 1000 cc of distilled spring water was heated slowly in a 2000 cc flask to 50° C., then rapidly to 60° C. when 10 cc of a 1% solution of gold chloride and 7 cc of a 2% solution of K₂CO₃ were added. At 80° C. 10 drops of a 1% solution of oxalic acid were added; at 90° C. the flask was removed from the flame and slowly drop by drop 5 cc of a 1% solution of formalin was put in. The flask was then shaken until there appeared a pink color, slowly changing to a violet and then to a deep dark red, clear to both direct and transmitted light, and occasionally with a light golden shimmer. In addition to having the proper color, this solution when set up in the ordinary manner, must also remain unchanged when run with a known normal spinal fluid; give a typical curve with a known paretic fluid; 5 cc of it must be completely precipitated in one hour by 1.7 cc of a 1% NaCl; and, most important of all, must be neutral to a 1% solution of Alizarin red in 5% alcohol. The technique for testing the neutrality of the solution is very simple. To 5 cc of the solution in a test tube is added 2 to 3 drops of Alizarin red as indicator. The color appears canary yellow in the acid, brownish red in the neutral, deep dark red in the faintly alkaline to a deep purple in the strongly alkaline solution.

Only the neutral solutions should be employed. If found either acid or alkaline, it can be corrected by adding small amounts of N/50 NaOH or HCl. After a satisfactory solution is once obtained, it appears to be very stable and if kept corked in a dark cupboard will remain satisfactory for months. The fine black precipitate or even the surface mould which occasionally appears in warm weather will not interfere with the reaction.

A so-called protected solution reacting neither to 1% NaCl nor to a known positive fluid is usually alkaline. Felton considers that such a solution is due to an unusually wide distribution of the colloidal articles from slow or irregular heating. We have found correct the observation of Craig that alkaline solutions are inert with a positive spinal fluid; slightly acid solutions will react as usual with paretic fluids but will also give with normal fluids a curve similar to that of syphilis, while a strongly acid solution will give very little reaction with a positive solution, but will show an abnormal reaction with normal fluids. Therefore, we agree with the majority of authors that a neutral solution is of the most vital importance.

The technique of setting up the test is very simple. Eleven clean test tubes are set up in a rack and to each is added 1 cc of a .4% NaCl. In the first tube in addition is placed .8 cc of the salt and .2 cc of spinal fluid, making 2 cc of a 1 to 10 dilution. From this tube 1 cc is removed and added to the 1 cc of salt in the second tube, making a solution of 1 to 20. This is continued to the tenth tube, which has dilution of 1 to 5120 and the last 1 cc of this dilution is discarded. Then to each tube is added 5 cc of the colloidal gold solution and the tube well shaken to facilitate mixture. The 11th tube therefore contains only NaCl and colloidal gold, and therefore serves as a control.

A positive reaction if present at all begins to appear at once and then intensifies for several hours, being complete at 8 or 12 hours. As Solomon and Welles have mentioned, all syphilitic curves appear the same at first, with a paretic one developing later, and are only complete after 12 hours, so that if read too early, a paretic curve may be confused with a syphilitic one. On the other hand a test showing no

beginning color changes at the end of half an hour may as well be discarded as none will appear later. For our readings, we designate an unchanged fluid as 0; a bluish red as 1; a reddish blue as 2; a deep blue as 3; a grey blue as 4; and colorless as 5. Because of the peculiar shades of red, all readings must be done with direct daylight, holding the tubes up against the sky, instead of against green grass or colored buildings.

The so-called typical paretic curves shows the first few tubes completely precipitated, giving a colorless solution, while lesser changes may appear in the remaining ones, as 5, 5, 5, 5, 4, 3, 1, 0, 0, 0. The syphilitic curve shows the first one or two tubes unchanged with a maximum color change which is usually 3, seldom beyond 4, in the 4th or 5th tube, as 00 2 3 3 1 1 0 0 0. This includes the curves of both tabes and cerebrospinal syphilis as this reaction does not differentiate between them. The so-called meningitic curve which does not distinguish between different types of meningitis or myelitis is designated by the early writers as "Verschiebung nach Oben" and consists of a curve showing color change in the right half of the tubes with a maximum reaction in the 7th or 8th as 0 0 0 0 0 1 3 3 1 0.

We feel that the colloidal gold reaction while requiring a careful technique has been simplified by careful workers until it is easily within the reach of any routine laboratory.*

(Discussion papers of Drs. Warwick and Nixon).

DR. S. MARX WHITE, Minneapolis: Mr. Chairman, Ladies and Gentlemen: I should like to emphasize the importance of the more widespread use of these diagnostic tests than now appears to be the case, because of the fact that a considerable number of individuals with cerebrospinal lues, or advanced lues, have very minor evidence of their disease. Many will have locomotor ataxia with only some areas of anesthesia or fixed pupils which might be missed by a very cursory examination. They may have very slight lightening pain or gastrointestinal symptoms, and it is a not infrequent thing for the clinician to see cases which on careful study prove to be tabes which have been subjected to abdominal operation, not once but two or three times, and it is a striking evidence of the carelessness—I think no lesser word should be used,—in the study of some of the gastro-intestinal symptoms

*For a more complete treatise of this subject see "Colloidal Gold Reaction and Its Clinical Interpretation," by Warwick and Nixon, in Archives of Internal Medicine, February, 1920.

that we go no further. The tabetic will often show minor symptoms or signs, and such examination should not be omitted from these cases of abdominal pain and conditions which might not seem to be related at all to cerebrospinal lues. It is only by the careful use of this test, and sometimes even then the careful neurological examination is of quite as much value as the cerebrospinal fluid, but these tests ought never to be omitted because of the positive results which are frequently obtained particularly with the colloidal gold and other laboratory tests.

DR. CHARLES E. NIXON, Minneapolis, (closing): Mr. Chairman, Gentlemen: I wish to emphasize, briefly, again, the importance of spinal puncture. In reference to the specificity of these methods, a rather interesting case occurred in our City Hospital recently. A very sick patient was brought in and Dr. Warwick did a spinal puncture and a very positive colloidal gold test was obtained with both luetic and meningitic curves, and with one thousand cells. The man was given salvarsan with very definite improvement, and that was continued and the man recovered so far as any symptoms of meningitis were concerned. The man was very ill and the spinal puncture was the deciding feature that saved his life.

PREVENTION AND CONTROL OF THE VENEREAL DISEASES*

By SHERMAN LULL, M. D.

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In the past fifty years the socialization of medicine has paralleled the centralization of commerce and the organization of labor. It is no longer possible for the individual physician to maintain the isolation and the arbitrary powers and responsibilities which were his in primitive times. The advance of both the art and the science has compelled the development of partnerships and group practice, in which the knowledge of one man supplements the lacks of another, to the advantage of the sick for whom and upon whom they work. As this idea of co-operative effort develops within medicine itself, a new form of relationship in the maintenance of human welfare appears upon the horizon. A partnership between intelligent and well informed public opinion and the physician as leader is the logical ultimate expression of the

trend of the times. Medicine is beset with problems whose solution is impossible except by the widest cooperation and the broadest understanding imaginable. The physician as a leader acting alone is helpless. It was said of the Roman legion that its tremendous effectiveness as against the phalanx was due to the fact that every man in it was an accomplished warrior who could, if alone, give admirable account of himself. To make every intelligent man, woman and child a legionary in the organization of the public health, some of the knowledge so long sedulously kept as the property of the profession of medicine must be imparted to the rank and file.

One by one the greatest scourges of the race are succumbing to this new strategic method. Malaria and yellow fever are giving way not alone before the advance of medical knowledge, but also before the popularizing of that knowledge which makes every day people intelligent cooperators in the campaign. Tuberculosis mortality is falling, not alone because of new conceptions in its treatment, but because of the tremendous force of public knowledge and sentiment. In time the same fate will await cancer, syphilis and gonorrhoea.

Syphilis and gonorrhoea perhaps more than any other of the great plagues which scourge humanity, need the new strategic method. Medically we are armed to the teeth against them. All the paraphernalia of battle is at hand. Against these two diseases we can move with irresistible force on the dawn of the day of human enlightenment. That dawn is very near. Once we can open the eyes of the every day man and woman to see the enemy as he is, his course is run.

There is no device known to a cruel, unscrupulous and implacable opponent which has not been used against us by these twin scourges. They have crept into our homes and murdered the innocent and the helpless. They have appeared to many a sincere well-wisher of mankind not in their true semblance of brutal, wanton and savage mutilators and destroyers, but in the disguise of well-wishers, guardians of the moral life, painful but just chasteners of iniquity. Many a sincere but uninformed or unthinking man or woman has shuddered to think that these things must be, and yet feared to protest against

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them, refused even to know about them lest with one horror removed or explained away, they should confront a worse one. We have lived the nightmare of one who dreams that his awakening will be his death, and dares not open his eyes.

Syphilis and gonorrhoea are not what public misconception makes them. Quietly and dispassionately examined, they can be easily seen to be no more disreputable than other disease enemies of the race. They have likewise no supernal power or commission. They are no more repellent to the senses than many another ailment. There is nothing in their origin which gives us cause to refuse to know about them. In fact an understanding of them is the more obligatory upon us because they undermine and attack the citadel of life itself. The clothing of mysterious words and allusions, of shame-fast silence, of false disgrace, of painted horror that surrounds them is their cloak of darkness which protects them from the vengeance we would visit on intimate and secret enemies. Like murderers who mingle with the crowd upon the very scene of their crime, syphilis and gonorrhoea stand so near to us that although they have attacked our very germ plasm and our physical immortality, we have not known them for what they are.

The movement for a new conception of these two diseases, which will make the common man a legionary, and will enlist against syphilis and gonorrhoea all the force of an enlightened public sentiment, begins with a choice of words. The armor of the third and fourth great plagues is words. For generations syphilis and gonorrhoea have been called venereal, until the mere use of the term throws a cloak of odium over any subject to which it is attached. People are afraid of it, afraid of being shocked, afraid of being besmirched, of having the loathsome thrust upon them. And all this repulsive connotation, wholly uncalled for as it is, plays into the hand of syphilis and gonorrhoea. Labels that attract lead us to scrutinize the object. Labels that repel, turn away our gaze and foster ignorance. Much of our public attitude toward syphilis and gonorrhoea, our false modesty and mistaken shame, our ultra-sexual point of view, is the product of false labelling. To look at syphilis and gonorrhoea with the verbal veil withdrawn is not to turn to stone before the

Medusa gaze, but to be inspired to dash at the monster and demolish it. To withdraw the veil and permit people to face the facts, is the first function of a public health movement against the "disease of vice."

A dispassionate and calm analysis; good Anglo-Saxon words; the simple dignity of truth-telling; iteration and reiteration, will yet awaken a sleeping public thought to the enemy within our gate.

Syphilis and gonorrhoea are neither crimes nor secrets, but are communicable diseases which are a decided menace to the health and efficiency of the people and which our State and National Health authorities are endeavoring to prevent and control. This endeavor is not a so-called "Reform" wave sweeping over the country, but a fight on these diseases in the interest of National health, which will be continued as long and as efficiently as that of any other communicable disease.

A scientific study of the prevention and control of any communicable disease requires a thorough knowledge of the causes, modes of transmission and prevalence of that disease. The cause and modes of transmission of the venereal diseases have been known to the medical profession for hundreds of years, but their extensive prevalence was not realized until through the activities of the profession which were brought about by the recent war conditions, there was discovered a prevalence of these diseases sufficient to seriously affect our military as well as our industrial man power; in fact they have been conclusively demonstrated to be sufficiently prevalent to endanger the future development of the nation.

These facts convinced President Wilson, his cabinet and Congress, that false modesty could no longer shield one of the greatest dangers to America's health; for it was realized then, as now, that ignorance and secrecy were largely responsible for the condition, and that exposure and publicity would bring reform.

For this reason the Government through the State and Federal Health Service has undertaken the task of controlling and preventing, as much as possible, the incidence of these diseases, which have been proven to be the most prevalent as well as the most destructive to our national efficiency, of any of the communicable diseases.

In order to change these conditions and to reduce as much and as rapidly as possible the incidence of these diseases, there has been formed, by Federal authorities and with the approval of the President of the United States, an organization known as the Interdepartmental Social Hygiene Board, consisting of the Secretary of the Treasury, Secretary of War, Secretary of the Navy, and the Surgeons General of the Army, Navy and the United States Public Health Service. The Surgeons General of the Army and Navy were placed in charge of and were responsible for the venereal disease control activities of their respective military organizations, while the Surgeon General of the Public Health Service, was placed in charge of the civilian activities; however, all of these activities are correlated, and in cooperation are directed to the one end, that of venereal disease prevention and control.

A Bureau of Venereal Diseases has been established by the Surgeon General in the United States Public Health Service, and a commissioned representative of this service is assigned to each state in which the Health Department has reached the required standard and complied with the necessary requirements; this officer in cooperation with the State Health Department is in charge of venereal disease control activities in the state, and is designated as the Director of the Division of Venereal Disease Control of the State Health Department.

The problem of venereal disease control and prevention is the most difficult with which health authorities are called upon to contend, owing to the four following reasons:

First, that the incidence of these diseases is primarily due to the strongest and least controllable, natural instincts and passions in the human mind.

Second, ignorance on the part of the public in regard to these diseases and their disastrous effects.

Third, the prevailing ignorance and false modesty in regard to sex, sex hygiene and concealment of the venereal diseases.

Fourth, the most important of all, is quackery, carelessness and ignorance in the diagnosis and treatment of these diseases.

If all communicable diseases were subjected to this same quackery, carelessness and ignorance

of modern methods of diagnosis and treatment their prevalence and mortality would be appalling.

One of the great obstacles to the treatment of gonorrhoea is an ancient lie expressed in the now hackneyed quotation of a current remark "A dose of clap is no worse than a bad cold." This monumental falsehood is at last being nailed by the combined efforts of medical profession and laity, city, state and nation. With such an impression of the disease dinned into his ears by tradition and associates it is little wonder that the young man of the average type finds the restrictions and exactions of adequate treatment irksome. It is little wonder also that he falls an easy prey to all sorts of quackery and to the wiles of Jimmy the drug clerk, who is always "there" with the right thing to take "to dry up a dose" and has no unpleasant ideas about the "water wagon" and avoiding sexual relations while the cure is going on. Of course the boy who "falls for" this stuff wakes up with a jolt some day, and crawls to some doctor's office with a chronic urethritis that may never clear up entirely, and a prostatitis and vesiculitis that have snuffed his chances for all that makes his later life what it ought to be. There are no superlatives adequate to describe the human vermin that thrive on this sort of thing. Among them must be reckoned not alone the advertising quack and the men's specialist, but those commercial concerns which make and market, and those drug stores which permit upon their shelves the innumerable "specifics" for the self-cure of gonorrhoea and "gleet," whose alluring promises appear upon the walls of every bar and toilet room. The "clap doctor" with his waving hair and the fatherly look and voice, is still with us. He is the man who plucks the inexperienced boy of the last cent he can beg, borrow or steal, and then turns him out with the words "That morning drop means nothing; you are cured." Not far removed from his level, to our shame be it said, is that type of physician, fortunately becoming more and more rare, whose conception of the cure of gonorrhoea ends with "drying it up" and whose ignorance of the microscope and all the modern tests for cure is only equalled by his scorn of them.

However, the young man who ignorantly sub-

jects himself to this injurious form of quackery is not the most pathetic victim of the faker, for he often marries and infects a pure and healthy young woman, the mildness of whose early symptoms never brings her to medical attention until the outlook for cure is almost nil, and even when definite and troublesome symptoms appear they are usually misinterpreted into the terms so often used by profession and laity, to conceal the facts such as "cold" on the bladder, with frequent urination; "leucorrhea," "abscess" following the first sexual relation after marriage; "appendicitis" when after the first menstruation, the gonococcus sets up an inflammation in the tubes; and "child-bed fever" perhaps if the ascent of the infection is delayed until after the first child is born.

If her infection is acute at the time of parturition, the probability of her being delivered of a case of gonorrhoeal conjunctivitis neonatorum is evident to every physician, and the delivery of the child opens the way to some of the most disastrous complications of the disease. After the passage of the child the womb is literally raw and bleeding, and the way is open through the lowered resistance of the tissues, which is impossible under normal conditions for infection to get a start. The gonococci in the neck of the womb seize the opportunity, in company with other germs, to make a whirlwind charge, and within a few days, or, perhaps a few hours, the mother may be dead of "child-bed fever." However, if she escapes death, she is likely to become a hobbling pain-wracked cripple until a radical operation relieves her of all the damaged structures.

Quackery and inadequacy in the treatment of syphilis carries more than the danger of failure to cure. It makes possible under an outward aspect of calm, the recurrence of infectious lesions, the progress of the disease in the internal structures, under a skin kept clean by halfway measures and permits the transmissions of the disease to others, even to the unborn.

Syphilis is one of the most remarkable diseases which affects the human race. It is a master disease, the peer, and indeed the superior of tuberculosis in the wide range of its influence over the fate of mankind, present and future. There is not a tissue or a structure of the body

which syphilis cannot affect, nor is there an aspect of the entire science of medicine in which it will not be encountered. Sir William Osler coined the famous phrase which for all time expresses the relation of syphilis to medicine "Know syphilis in all its manifestations and relations, and all other things clinical will be added unto you." No lane is so long that one may not find syphilis at its turning. The disease has changed the destiny of mankind upon the earth. If it should cease at this moment to be transmitted, its effects would not disappear from the world within two and perhaps three generations. Few indeed of living human beings can boast an ancestry free from its remote effects.

The adequate treatment of syphilis, by whatever means it may be approached, is not a matter of days or weeks, but months and years, necessitating considerable expense and a degree of expertness that is not generally enjoyed. In this simple statement lies four-fifths of the problem of the disease in personal and social life. Just what constitutes adequate treatment can only be determined in the individual case. However, it may be safely said that the three or four injections of arsphenamine and a few mercurial injections or rubs which many patients get is not adequate. One or two negative Wassermann tests are no measure of adequacy, popular though this fallacy is. In fact some of the most recent work on syphilis is tending to show that what even a good deal of treatment accomplishes is simply a reduction of the infection to harmlessness, rather than a cure signaled by the killing off of all germs. In the face of such considerations, it is becoming increasingly difficult to tell the patient just what cure means and what will secure it. It should in general be understood that for all practical purposes, cure means lifelong freedom from all symptoms and signs of the disease, and no risk of transmission to others, hereditarily or directly.

Frequent efforts have been made to control and limit the spread of the venereal infections by segregation and examination of carriers, all of which have been proven of little or no value, but the success of the present plan is assured, the degree of which alone can be questioned.

This plan contemplates three separate programs of activities for the accomplishment of

the following objects; first, the education and enlightenment of the people in regard to the subject; second, the control of carriers; and third, the adequate treatment of the infected.

This plan is characteristic of the American in that it is bold, practical and absolutely modern. The spectacle of the Government's bending its efforts to the solution of the problem of venereal diseases control would astonish our ancestors no less than would the automobile, the flying machine and the wireless telegraph.

But the entire situation is rapidly being modernized, and thanks to splendid cooperation from medical profession, state and city boards of health, broad-minded editors and others, success is now in sight.

The words "syphilis" and "gonorrhoea" are appearing daily in the largest newspapers in the United States and the readers are coming to look upon them as the names of diseases, and not of crimes.

Motion picture plays treat the subject quite frankly without offending audiences. Lectures are being delivered to mixed audiences in public meetings, and the sermon is being preached from the pulpit. Primary sex knowledge is being imparted to High School pupils, and educational pamphlets written especially for each of the different classes of people are being widely distributed, to reach all classes of people.

Regulations of the State Board of Health have been adopted and legislative enactment secured which with proper cooperation will insure control of not alone the female carrier but the infected male from the time medical aid is sought until he is rendered non-infectious or red.

The free clinic has been established in the larger cities for the treatment of the indigent and those under arrest, detention or in penal institutions, and it is presumed that these free clinics will be developed into both free and pay clinics for the most scientific diagnosis and treatment obtainable.

Every day the field of the worker broadens and the opportunity for the plan of the State and Federal Health Service to attain success comes nearer realization.

NOTES ON INJURIES TO THE SKULL*

By ORVILLE N. MELAND, M. D.
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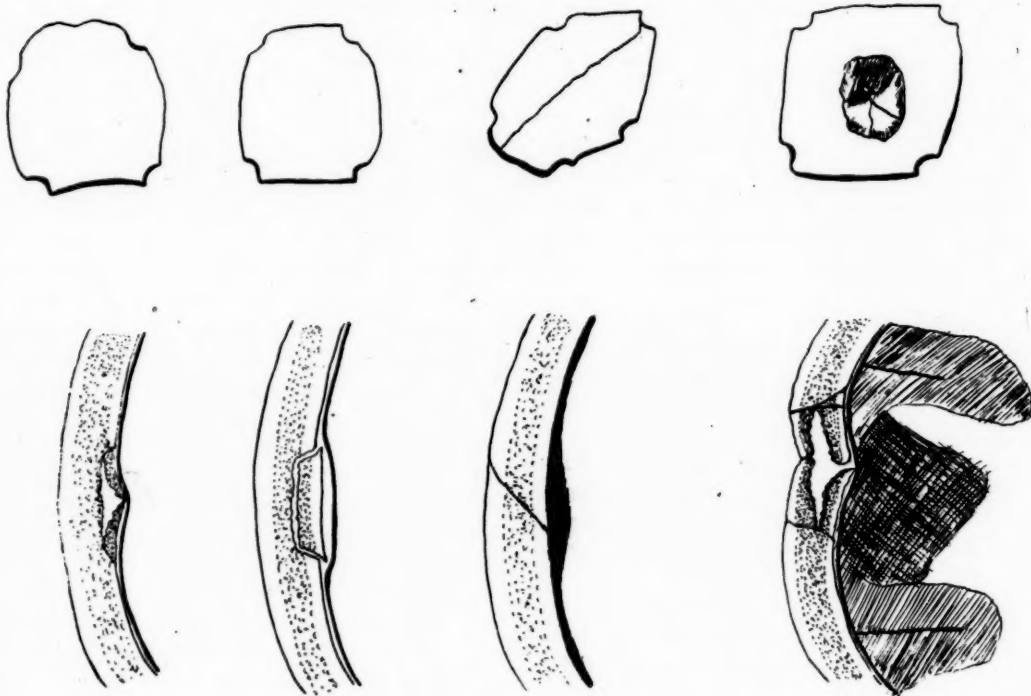
The purpose of this paper is to make a brief report upon injuries to the skull and brain as seen in an overseas hospital. It does not represent a concentrated study of these cases but merely a few general observations, with especial references to treatment, as these cases came in with the other wounded. Bearing these things in mind, certain conclusions may be drawn which may possibly be beneficial in civilian practice when we are called upon to treat this type of injury.

The observations in this paper were made on about 50 cases, which were reported to Colonel Harvey Cushing by Major Martin W. Reddan, whom it was the writer's good fortune to work with in a number of operations. Thirty-five of these were operated on primarily at the hospital and the remainder had been operated on at some further advanced station. A few of these latter were reoperated on because of the presence of foreign bodies which had not been removed. Two cases developed cerebral hernias, one of whom died from rupture of an abscess into the ventricle. One case of basal fracture was brought in, which died from hemorrhage from the cavernous sinus, as shown by autopsy. With the exception of the two fatal cases mentioned above, the remainder were evacuated to the rear. What the mortality rate amongst them was, I do not know, as that is largely dependent upon infection. Some of the patients were permanently affected with paralysis of various degrees, due to injuries in the motor cortex, while one was permanently blind, due to severance of both optic nerves; but a large number showed no signs of any derangement whatsoever.

In looking over the rather extensive literature on injuries to the brain and skull, we find many classifications of these wounds. Cushing (1) (2) in two very good articles which seem to cover the subject thoroughly, divides the type of wounds into groups of varying degrees of severity, but for simplicity's sake, we

In the compilation of this paper due credit is given to John H. Stokes, A. B., M. D.

*Read at the meeting of the Red River Valley Medical Society, Crookston, Minn., Oct. 8, 1919.



Groups 1 and 2 (Cushing)

may say that there are roughly two classes; those without penetration of the dura and those with penetration of the dura with destruction of brain tissue and lodgment of bone particles and the foreign body in the tract. However, if you will turn to the wall, we will go over the illustrations of Cushing's groups as shown on the charts he has kindly permitted me to use.

(1.) Simple scalp wounds. This type is relatively simple, but unless one has been careful in his examination, one may overlook serious injuries masquerading under this simple diagnosis.

(2.) Local fractures with intact dura with or without cerebral contusion. Here, he finds one type with an external table intact and a fracture of the inner table, or a second type where there is a depression of both tables. In these cases the prognosis is very good, even though one opens the dura during exploration.

(3.) Wounds with local depressed fractures, lacerations of dura and cerebral contusion. Here, the prognosis is good even though the

dura is perforated as there usually is no extrusion of brain matter and the destroyed portions are easily removed.

(4.) Wounds, usually of the gutter type with detached bone fragments driven into the brain. Here, there is a direct opening from outside in and of course, there is greater chance for infection, with extrusion of devitalized brain tissue.

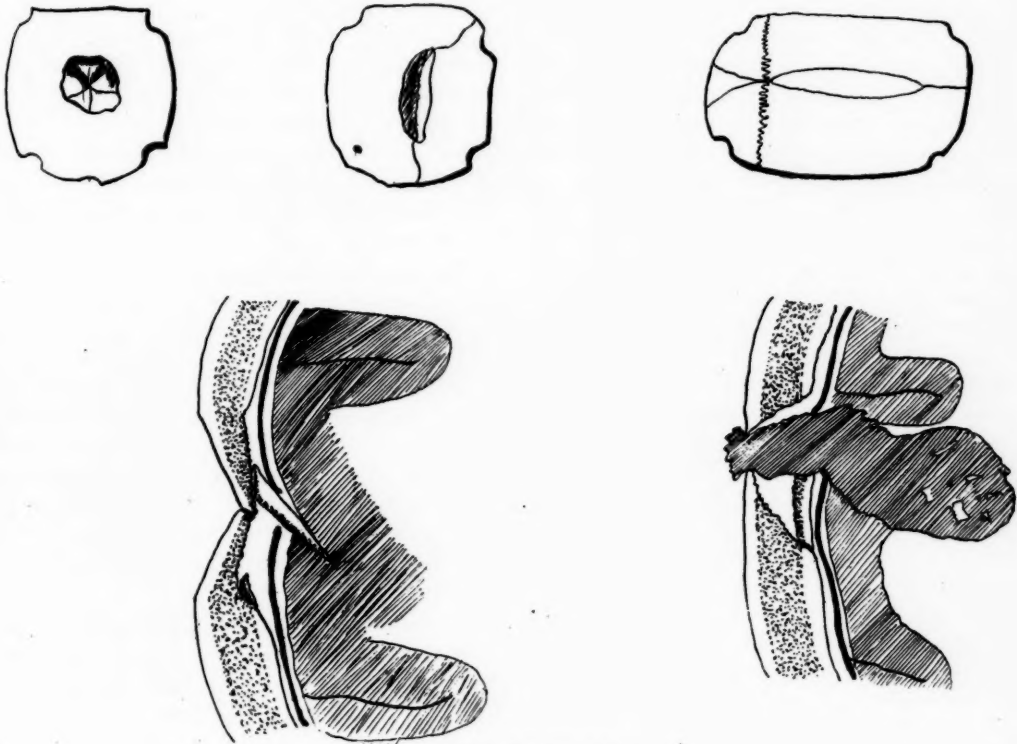
(5.) Penetrating wounds with lodgment both of projectile and bone fragments.

(6.) Ventricle penetrated or traversed by bone fragments or projectiles.

(7.) Wounds of craniocerebral type involving face and ear.

(8.) Through and through wounds involving the cranial chamber.

In these groups from 5 to 8 inclusive, the prognosis is more or less grave because of the amount of devitalized brain tissue and of the presence of bone fragments and projectile in the tract. Infection is very apt to take place and is especially grave where the ventricle has been penetrated or where the missile has passed



Groups 3 and 4 (Cushing)

through one of the nasal or aural sinuses before passing into the brain as the fragments are more apt to carry in infection.

(9.) Bursting fractures with wide spread cerebral contusion. In this group, there is a wide destruction of bone and a widespread contusion of the brain. Infection is not a great element here. The mortality is high, and a proper cerebral decompression is the only treatment.

Of these various grades of wounds, we observed only a very few from 4 to 9, except such as had been operated on previously. These cases were usually grave and were often seen only by the "Head Teams" in advanced stations, as shock and hemorrhage would invariably be the cause of death. Most of the head cases seen were of the first three types, largely due to the use of the steel helmet. Time and again, the greatest force of the projectile was broken by this protection and what would have been a grave head injury became an injury of the simpler type, often of Group 2 or 3.

In the matter of treatment, there seemed to be a divergence of opinion; many contending that the same principles of debridement with the wide open wound should govern here as well as in other portions of the body. Various ways of taking care of these unfortunate boys were tried out, but gradually the method evolved by Cushing seemed to have been accepted and that was the one used by us.

In the first place, there was always a careful examination of all wounds, with an x-ray of the skull in both planes. This gave a clue as to the presence of a foreign body and often an insight as to the presence of a fracture. Cushing laid especial stress on the thorough examination of wounds which were diagnosed "scalp wound," and to this we can heartily agree, for, in a number of cases, patients walked in, in which a depressed fracture was present with no symptom except a slight headache, and upon operation there was found a depressed fracture of the inner table with an extra-dural clot as shown in Group 2.

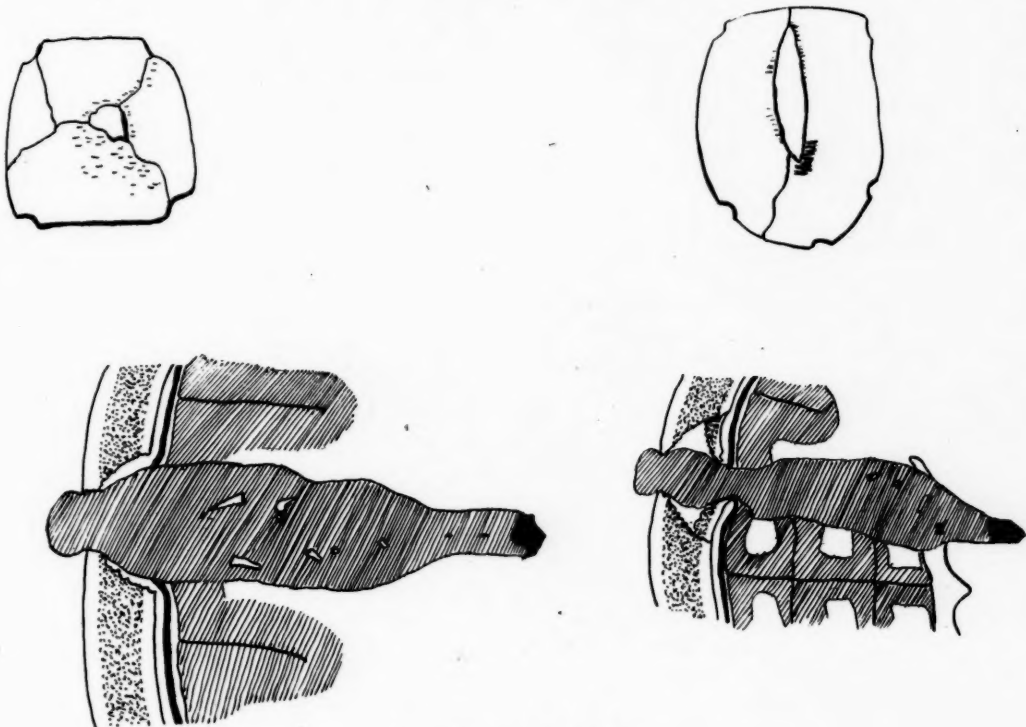
All cases coming to operation had their heads thoroughly shaved and after painting with tincture of iodine, a tripod incision was made through the wound in such a way that the wound surface were cut away. The pericranial tissues were then lifted up and the perforation or dent in the skull revealed. By means of a trephine and burrs, a small block of bone containing the infected perforated bone was removed "en bloc" and the dura inspected. If there was a clot present, it was removed and if the dura was of good color and had not been perforated, the wound was sponged off with Dakin's solution and after inserting a rubber tissue drain at the lower angle, it was closed tightly with silkworm gut sutures. However, if the dura was discolored and there was no pulsation present, the dura was carefully opened and the subdural clot removed, with cleansing of the brain tissue. Thereafter, the dura was carefully sutured with fine silk and the wound closed as before. There was more or less hesitancy in opening the dura, passing from what was a dirty field into a clean field, but, as Cushing states, with the improvement of technique, there seemed to be less risk in doing this, as compared to the benefit the patient derived by evacuating the subdural clot and removing brain pressure. Where there was a penetrating wound with the lodgment of a projectile or bone particles along the path of destruction, there was an attempt to remove the foreign body and to cleanse the tract, but this cleansing of necessity could not follow the rules as laid down for a classical debridement. Exploration by the finger was not looked upon with favor, although Gray (3) justified it because the tract is already present and it has already been infected by the projectile and the particles carried in with it. The cleansing as done by us was done by Cushing's catheter method. An ordinary rubber catheter was passed into the tract and suction by means of a syringe applied to the other end. This suction pulled up destroyed brain tissue, small bone fragments, old blood and other foreign material and it could be expelled upon a piece of gauze, where the material was examined. If, during the passing of the catheter, a roughing was felt at the bottom of the tract, the catheter was removed and a small forceps inserted, and

often one was rewarded by the removal of a foreign body, which most often was a piece of shell casing from high explosive. When all this was done, the wound was closed as mentioned before, with a rubber tissue drain at the lower angle and silkworm gut sutures through all the layers. The drain was removed in 48 hours and the sutures removed according to the condition of the wound.

The anesthetic we used was ether, which we found entirely satisfactory, although most operators preferred a local anesthetic. Local anesthesia was used in a few cases, but as we were forced to use cocaine instead of novocain, which we were unable to obtain, ether was preferred. Local anesthesia undoubtedly has great advantages over the general since you can have the co-operation of the patient if he is conscious and this method would have been used more often by us if we could have obtained novocain.

In regard to the use of antiseptics in the wound, we were also handicapped. Dichloramin T in oil seemed to be the antiseptic of choice, but we were forced to use Dakin's solution. The disadvantage with Dakin's solution, which is an aqueous solution, is that its use leads to an edematous condition of the brain and surrounding tissues and there was more of a tendency to hernia cerebri.

The prognosis varies according to the wound, and is dependent upon a number of factors. Shock and hemorrhage carried off a number of patients before any help could be given them, largely because of the location of the injury and because of the wounding of large blood vessels. Infection was another factor, especially in the penetrating wounds, where the amount of brain tissue destroyed was large or where the ventricles had been penetrated and a meningitis came on secondarily. Many of the patients were saved, but were left with palsies of different sorts, while many who had depressed fractures and no dural penetration were distinctly benefitted by operation. The patient with a palsy due to destruction of the brain tissue itself will have a permanent defect, but the other patient will continue to improve and I cannot help but feel that the operation will prevent a possible traumatic epilepsy due



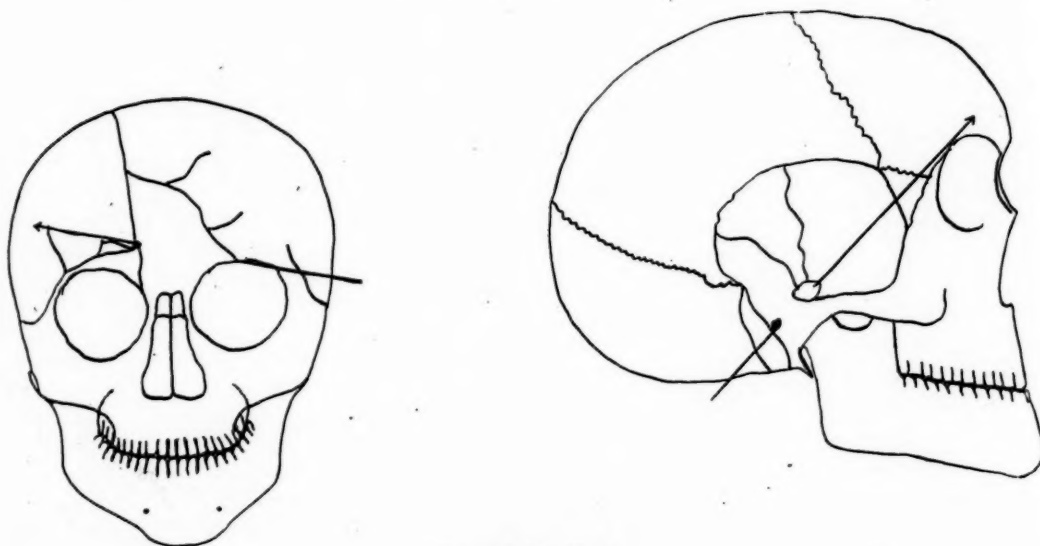
Groups 5 and 6 (Cushing)

to pressure from an organized blood clot with cyst formation.

Our war experience has shown us that wounds of the brain are not necessarily fatal; also, that the brain will tolerate a great deal of damage and infection, with recovery. Of course, in an organ that is really the "telephone switch board" of the body, injuries in this region are often reflected in permanent paralysis if the damage is to the motor area. However, one of the biggest lessons which have been learned is the frequency in which a fracture of the inner table takes place, with an extra dural or intra dural clot, with very little evidence of any grave injury. It is this type of case that we will see in civilian practice and it will be up to us to decide what the course of treatment shall be.

Now, turning our attention to civilian practice, what can be gained from this military experience which may be of use? In looking over the literature, we find that skull and brain injuries are not as infrequent as we would think.

Harris & Nissen (4) report 540 fractures of the skull at the Boston City Hospital between 1902 and 1917 which is an average of 36 cases annually for one hospital alone. The same state of affairs takes place in other communities. These cases must be treated, but heretofore, we have often contented ourselves with "watchful waiting" after applying an ice cap. Our experiences have demonstrated that many simple scalp wounds are often complicated by a fracture of the inner table and an extra or intra dural clot. Moreover, it has been shown that even in infected cases, if surgically treated and if given half a chance, nature takes care of these persons in the same way as she does infections in other portions of the body. Furthermore, an injury to the brain is not necessarily more fatal than any other organ provided the injury does not involve the vital centers or does not rupture the large vessels causing an inaccessible hemorrhage. Therefore, it seems reasonable to the writer that, after a careful study, most traumatic skull injuries, not in



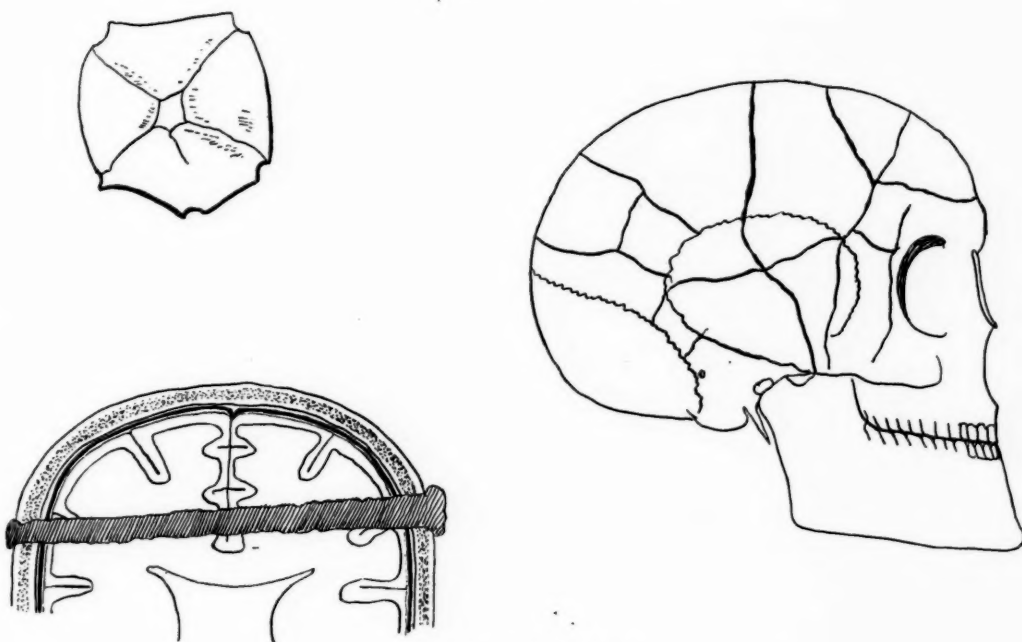
Group 7 (Cushing)

shock, followed by evidence of concussion and pressure should be explored, bone fragments lifted up, clots removed and all sources of hemorrhage controlled. It is true, that the patient may recover from the immediate injury without operation but in later years, he may be a victim of epilepsy due to an unrelieved pressure following his earlier injury. Even in fracture of the base of the skull where the hemorrhage is not accessible and where there is a rising blood pressure, and lumbar puncture reveals a blood tinged fluid under increased pressure, it is advisable to do a subtemporal decompression, since by decreasing intracranial pressure, there is a fall of blood pressure and this in itself may stop any further bleeding.

To illustrate the possibilities along this line, I wish to report two cases.

Case No. 1. E. V., male 27 months old, was brought into the hospital at 11:30 p. m. July 20, 1919. Six hours previously, his parents had found him in the pasture where he had been stepped on by one of the horses. He was unconscious and bleeding from a wound over the right parietal region. When examined, he was unconscious and slightly resistant to anyone touching his head. There was a wound 1.5 cm. long over the parietal region from which, after a short time, a small amount of

destroyed brain tissue was extruded. His eyes were closed, pupils dilated and there was a marked weakening of the right arm and leg. Pulse 106, respiration 20. After an x-ray was taken, which was rather doubtful as to the extent of the lesion, we finally decided to operate. A tripod incision was made revealing a compound comminuted fracture of the right parietal and temporal bones similar to the chart as shown in Group 9. There were 4 or 5 depressed portions of the skull which were removed and a linear fracture was disclosed running up over the vertex and down onto the base in the posterior fossa. The dura was torn and destroyed in a number of places and there was marked destruction of brain tissue with profuse bleeding, both capillary and arterial. Bone fragments were removed, the larger vessels ligated and the capillary hemorrhage controlled by small pieces of muscle. The dura was then patched up as well as possible with fine catgut and we then noted that there was a considerable defect which could not be repaired. The opening in the skull measured 3x4 centimeters. After washing out the wound with Dakin's solution, a rubber tissue drain was inserted at the lower angle and the skin and pericranial tissues sutured with silkworm gut and a dry dressing applied. Immediately after operation, the pulse was 180. The next



Groups 8 and 9 (Cushing)

morning it was 176, temperature 104, respiration 56. From then on, the pulse, temperature and respiration dropped until on the third day it was normal. The wound was dressed on the second day and the rubber drain removed. On the 22nd, the baby opened its eyes and the strength in the right arm and leg seemed to have improved. On the 24th, there was a little extrusion of brain tissue but the wound looked healthy. The eyes were open but there was no light perception. Ophthalmoscopically, the right eye showed congestion of the disc, the left eye congestion of the whole retina.

Aug. 5th. Good vision. Moderate cerebral hernia. Wound dressed with Dichloramin T and tight dressings applied to overcome the waterlogged condition of the brain. Patient in good condition, normal in all respects.

Aug. 18th. Cerebral hernia touched with formalin solution.

Aug. 24th. Area touched with formalin. Covered with black eschar, level with rest of skull. Dry dressing. Patient walks with a slight outward swing of the right leg. Sent home.

Sept. 8, 1919. Return for dressing. Skin

creeping in at the edges. Eschar in good condition.

Oct. 31, 1919 wound completely healed. Patient showing no sensory or motor disturbance.

Case No. 2 T. T., male, aged 46, by trade a grain buyer. Previous history negative. While working on an elevator, his ladder slipped and he fell, striking his head on a rail. He became unconscious immediately and was brought to the hospital 20 hours later. July 30, 1919. There was complete coma. Pulse 52, temperature 99, respiration 22. Over the left parietal region was an area where he had been bruised. Lumbar puncture was done; the fluid obtained was under pressure and slightly blood tinged. A decompression over the contusion was done by Dr. T. Bratrud and a small amount of bloody fluid removed. Wound closed with silk-worm gut and a rubber tissue drain inserted at the lower angle.

Aug. 2nd. Drain was removed. Patient conscious.

Aug. 5rd. Patient unconscious. Cheyne-Stokes breathing. Paralysis right side of face, able to talk. No headache, sees well, moves all his limbs. Pupillary reflexes equal on both

sides. Face pulled slightly over to the left side. Abdominal reflexes present but sluggish. Biceps jerks more marked on right than left. Knee jerks equal. No Babinski or ankle clonus.

Aug. 8th. Restless. Wound dressed. Good condition. Decompression working as evidenced by a pulsation over decompressed area.

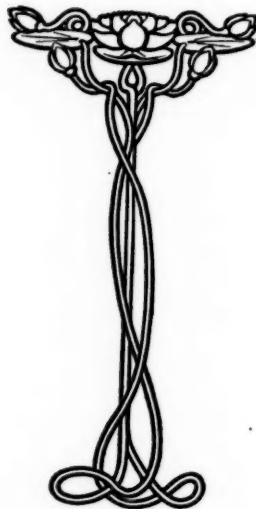
Aug. 17th. Rational.

Aug. 21st. Wound healed. Sent home.

These two cases are merely examples of the run of cases which we, as general practitioners, will see and merely show what can be done for these patients when we are called upon to do anything for them.

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Vol. III

April, 1920

No. 4

EDITORIAL

MINNEAPOLIS CLINIC WEEK

We have no hesitancy in assuring the medical profession of the state that Minneapolis Clinic Week this year will surpass its previous record. This convention meeting for the third time this year will have become a habit and a good one at that. It is a rapidly growing institution.

Coming as it does this year during the week preceding the annual meeting of the American Medical Association in New Orleans, many physicians will be able to take in the Minneapolis meeting, en route. Thus a rather unusual opportunity is afforded those who will, to visit Minneapolis and see what the members of the Hennepin County Medical Society are doing in a medical way. The location of our State University in Minneapolis and the unusual hospital facilities of the largest city in the state offer an unusual stimulus for high grade medical work.

THE VENEREAL CAMPAIGN

The passage by Congress of the Chamberlain-Kahn bill created a Division of Venereal Diseases in the United States Public Health Service. This branch of the service has instituted a nation-wide attack on the venereal situation and its campaign has been conducted among physicians, dentists, druggists, nurses,

medical and allied colleges, professional journals and advertising media thruout the country.

During the last fiscal year which ended June 30, 1919 communications were sent out to 132,000 doctors thruout the country. Each was asked to return a card agreeing; first, to report venereal diseases in accordance with the law; second, to do his part in seeing that venereal patients not treated by himself were referred to a capable physician or clinic; third, not to dispense venereal remedies himself, unless they could not be obtained by a drug store and not to prescribe any proprietary remedy marketed for self-treatment and fourth, to give every venereal patient a circular of instruction to be furnished by the Public Health Service or the State Board of Health. Favorable replies were received from about fifty per cent of those addressed. Why a greater percentage did not agree to do their part in this campaign is difficult to understand unless the other fifty per cent do not treat venereal patients. To each physician returning a card, a revised Manual of Treatment of Venereal Diseases was sent. A copy of this Manual may now be obtained by any physician so desiring.

In order to better equip the medical profession in general to treat venereal conditions a plan was suggested to improve undergraduate and graduate instruction in medical and allied schools thruout the country. This is an important recommendation. Most physicians are not interested in venereal diseases sufficiently to become posted on the pathology and treatment of these conditions and have no moral right to half-treat such patients. Reputable physicians are daily writing prescriptions for medication without making the necessary examinations.

In an effort to eliminate the sale of nostrums for self medication directly to the public, letters were sent to about 50,000 druggists throughout the country. They were asked not to prescribe or recommend remedies for these diseases; not to buy any proprietary remedy to be sold to the public for self treatment and to distribute literature furnished by the Surgeon General to persons asking for such remedies. Over fifty per cent of the druggists responded favorably.

Quack doctors and medical institutions were

attacked by requesting some twenty thousand newspapers and magazines to refuse advertising to such individuals and to those nostrums intended for self administration. Only 140 of this number refused cooperation.

The campaign is being continued among dentists in order to better instruct dentists and dental students in the recognition of syphilitic mouth conditions. The tendency for dentists to refer directly to laboratories and even go so far as to associate themselves with general laboratory men, it is to be hoped, will not be encouraged by this campaign. The training of a dentist does not enable him to diagnose general diseased conditions not interpret laboratory findings.

In Minnesota activities have been carried on thru the Venereal Division of the State Board of Health. State regulations effective July 31, 1918, gave the state the right to treat individuals suffering from communicable diseases, including all manner of venereal diseases. This same law prohibited the sale of venereal remedies except on a physicians prescription.

Ammended regulations adopted April 29, 1919 required that each physician making a diagnosis of syphilis, gonorrhea or chaneroid report the same immediately to the State Board of Health on a form supplied for that purpose. The name and address need not be reported, as each form is numbered. There can be no reasonable objection to this procedure which furnishes necessary data.

When a venereal patient changes physicians the second physician must notify the first one on card "B", also supplied by the State Board of Health, that he is treating the patient. If an uncured patient stops his treatment and no card B is received from another physician within the prescribed fourteen days following the last visit, card "C" giving the name and address of such patient must be sent in to the State Board. This enables the State authorities to investigate. Any individual known to be spreading a venereal disease must also be reported.

Local health authorities are required to follow up venereal cases and have power to quarantine, cure or written promise to continue treatment with a named physician being required for release.

One of the regulations in force prohibits the issuing of certificates of freedom from venereal diseases which can be used for solicitation purposes. As a matter of fact any certificate of this character can be used for solicitation. Some states, Wisconsin for instance, require such a certificate before a marriage license is granted. The essence of the law is simply that physicians must not issue certificates of this kind indiscriminately.

The entire venereal situation is a delicate one. The law authorizes the state to treat venereal disease. If those who can afford to pay are treated by the several clinics already established in the state, the venereal specialists will find a falling off in their practice. If such individual is refused treatment, he may not have his condition treated privately. What happens? He is reported to the State Board who order him to take treatment at the venereal clinic.

With the state establishing venereal clinics where treatment as well as diagnosis is free and with the various municipalities establishing diagnostic tuberculosis clinics it is not difficult to see which way the wind blows.

METER—LITER—GRAM.

To the credit of the World War will have to be included a definite impetus towards world standardization of weights and measures. The disadvantages of separate national systems was made tragically apparent when France, England and the United States became allies in the recent vital conflict.

It is a most remarkable fact that Great Britain and the United States are the only countries in the entire world that have ultra-conservatively adhered to their awkward, non-standardized systems. We perhaps have not been quite so pig-headed as our British cousins as our currency at least, is established on the decimal system.

It has gradually been dawning in certain British and American minds of late, that if Great Britain and America are to build up world-wide trade in the lively competition which is bound to occur in this period of reconstruction, the throwing over of what have proved to be provincial systems of weights and measures is essential.

Opposition to the change is made on the ground of the great loss of equipment involved. It has been shown that this loss is reduced to a minimum if the equipment now in use be continued during its lifetime but be replaced by newly standardized equipment only.

The advantages from an institution of the meter—liter—gram system of weights and measures because of its simplicity and world wide acceptance (some two hundred and twelve countries now using it) indicate that the present agitation for proper legislation will be successful.

It is not commonly known that the Englishman James Watt thought out the metric system and that our weights and measures and the British system of coinage were handed down from the German Hanseatic League. We first recognized the system when our coinage was put on its present basis. In 1866 Congress legalized the metric system but failed to make it the exclusive system. Germany scrapped the old system in 1871.

The medical profession, though tardily, did see the advantages of the metric system. During the transition period, in which period we may be said to be at present, it became necessary to know both systems. This condition of affairs causes some wierd mental gymnastics with some of us in the realm of prescription writing.

YALE FRESHMEN

The army intelligence test was given in the Fall of 1919 to four hundred Yale College Freshmen. The test is supposed to be one of intelligence and little influenced by schooling.

The following is a table showing the results compared with army figures:

Rating	Drafted Men	Freshmen	Officers
A	7.7%	85.5%	48.4%
B	12.7%	13.7%	34.6%
C plus	20.4%	0.7%	13.8%
C	29.4%	0	2.9%
C minus	19.8%	0	0.3%
D	6.8%	0	0
E	3.2%	0	0

Some 17 per cent of the Freshmen who made an A rating were warned about the quality of their college work a few months after matriculation; some 49 per cent of those with a B

rating and 100 per cent of those with a C rating.

The tests were conducted by the psychology department to test the tests rather than the students. If a carefully worked out psychological test could be prepared which would show for instance that a college candidate with a certain test rating had according to experience, only one chance in ten of finishing his Freshman year, the test might become of very practical value.

REPORTS AND ANNOUNCEMENTS OF SOCIETIES

MINNEAPOLIS CLINIC WEEK

Minneapolis Clinic Week will be held Tuesday, Wednesday, Thursday and Friday, April 20 to 23, 1920. Clinic will be given each day until three o'clock in the afternoon and clinical demonstrations from four to six o'clock at the Radisson Hotel.

The Hennepin County Medical Society will hold their annual banquet on Monday, April 9th. Dr. Charles H. Frazier of Philadelphia will be the speaker at this banquet. All visitors are invited.

Hotel reservations should be made through Dr. G. Elmer Strout, 900 Donaldson Bldg., Minneapolis, Minn.

AMERICAN PROCTOLOGIC SOCIETY

Twentieth Annual Meeting, Atlantic City, N. J.,
June 7-9, 1919.

Officers elected for the ensuing year:

President, Collier F. Martin, M. D., Philadelphia, Pa.
Vice-President, J. Coles Brick, M. D., Philadelphia, Pa.

Secretary-Treasurer, Ralph K. Jackson, M. D., Fall River, Mass.

Executive Council—

Jerome M. Lynch, M. D., New York City.
Collier F. Martin, M. D., Philadelphia, Pa.
Dwight H. Murray, M. D., Syracuse, N. Y.
Ralph K. Jackson, M. D., Fall River, Mass.

The next meeting will be held at Memphis, Tenn., April 22 and 23, 1920.

MINNESOTA ACADEMY OF MEDICINE

The January meeting of the Academy was held in these rooms on Wednesday evening, the 14th. Dr. Sweetser presided. After hearing the minutes of the previous meeting, which were approved and placed on file, the question was put whether new members should be elected at this time. It was decided that such election should be postponed for another month. The rest of the evening was taken up with reports of cases and presentation of specimens. Forty members and two visitors were in attendance.

ANKYLOSIS OF LOWER JAW WITH CORRECTIVE TREATMENT

The first report to be made was that of Dr. Ritchie. Several cases of ankylosis of the mandible with corrective treatment were shown by means of lantern slides. Also in the same way, Dr. Wilcox illustrated a method of treating fractures of the tibia and fibula by extension. Both subjects, Dr. Ritchie's and Dr. Wilcox's, were fully discussed by Drs. Geist, Law, Colvin, Benjamin, and Farr.

COLLOID CARCINOMA FOLLOWING GASTROENTEROSTOMY

Dr. Benjamin reported the case of a man 56 years of age on whom he did a gastroenterostomy two years before, removing an obstructive mass from the pylorus. For a time following the operation the patient improved, gaining in weight and enjoying a better appetite. A month ago a tumor was demonstrable over the site of the original trouble. The abdomen was again opened and a colloid carcinoma as large as a man's fist removed. (Specimen shown.)

UMBILICAL HERNIA; STONES IN GALL- BLADDER

Another case reported by Dr. Benjamin was that of a woman 69 years of age with umbilical hernia and gall stones. Upon operation, the protruding tumor proved to be a mass of omentum. An elliptical incision, which later was closed by imbrication, was made use of. Through another incision (modified Bevan), the gall-bladder was opened and a dozen or more stones removed, several of which were a cubic inch in size, and many were as large as marbles. (Specimens shown.)

Dr. Little showed skiagraphs of gall stones and bladder stones, with full description of the cases. He also reported a peculiar condition found in connection with a case of appendicitis.

SARCOMA OF LOWER JAW

The following case was reported by Dr. Law. Three months ago a girl seventeen years old noticed a swelling in the right lower maxilla. The growth enlarged rapidly, until its removal a few days ago, when it had reached the size of a small orange. The tumor was uniformly hard and surrounded the jaw, lying between the symphysis and angle. To say what it was, without first making a section, was found difficult. It might be a benign odontoma, suggested by its extreme hardness; it might be an epulis, one of the growths of low malignancy, and one which rarely metastasizes; it might be a dentigerous cyst; or it might be one of the sarcomata. Radiography threw very little light on the subject; it showed only loss of bone substance. As surgical interference depended on a definite diagnosis, a preliminary section was made. The tumor was found to be a sarcoma of the small, round and spindle-cell type. (Specimen shown.)

INTESTINAL OBSTRUCTION WITH EMPYEMA OF GALL-BLADDER

A second case reported by Dr. Law was that of a woman 58 years of age on whom a diagnosis of intestinal obstruction had been made. For days she had vomited. There was complete obstipation for four days. Abdomen flaccid, epigastrium tense. A mass could be felt projecting from the edge of the liver which proved to be an empyema of the gall-bladder. There was also complete obstruction of the duodenum from adhesions, and from a portion of the great omentum which lay over the bowel and was adherent to the cystic duct. These were released and the gall-bladder was removed. Death followed in 36 hours, and was probably due to the toxemia incident to obstruction.

STONES IN KIDNEY AND BLADDER

The following three cases were reported by Dr. Abbott:

Case I—Skiagraph showing a urethral catheter pointing to a stone in the right kidney. The case was presented because the violent colics of which the patient complained occurred exclusively on the left side and in no case on the right side where the stone was located.

Case II—Skiagraphs showing a large stone in the bladder with a changed position of the stone corresponding with a changed position of the patient. The case was shown because a stone was not observed by the cystoscope. Cystoscopy was done, however, before the x-ray picture was taken. The stone probably could have been found had this part of the examination been made afterward, after it was known positively that a stone was in the bladder. It shows the importance of thoroughness in the use of the cystoscope.

Case III—Skiagraph of a man who had stones in the bladder for two years. The stones were only accidentally found on making a general examination of his urinary tract. The urine was normal, without blood, pus, or albumin; and he had never had any pain in the bladder, nor disuria. Once in a while, if the flow was delayed he would give himself a few shakes—"shimmy" as Dr. Abbott put it—and the urine flowed freely.

STONE IN BLADDER, COMPLICATED BY ANOTHER IN THE PROSTATIC URETHRA

Dr. Owre brought attention to the following case. A man 38 years of age was admitted to the City Hospital with retention of urine that was thought to be due to urethral stricture. He had had dribbling of urine for several years, with attacks of acute retention. A silk-webb catheter met with obstruction in the prostate urethra, and some foreign body could be felt with it. If the catheter was held firmly against the obstructing body, the patient was enabled to empty the bladder. Rectal palpation disclosed a large stone, about the size of a pecan, in the prostatic urethra, which could be moved, but it was not possi-

ble to push it back into the bladder. Still another stone could be palpated in the bladder. This one was as large as a goose egg, and, no doubt, kept the other from being pushed up. The two could be clicked together. The presence of a stone in the urethra made litholapaxy of the larger one in the bladder impossible. (Plates shown.)

LESION OF SPINAL CORD

Dr. Mann exhibited a tumor as large as a man's thumb and gave with it the following history: A man of 50, anemic and cadaverous; unable to attend to business; giving a negative family and personal history, came complaining of pain in his left hip, left lower lumbar region, and left leg. Many physicians had examined him, but none offered any relief. He continued to grow thinner and more cadaverous as the years went by. One physician thought possibly the man had a sacroiliac joint disease, and fitted him with a Goldthwait belt. This only made his pain worse. In 1917 he consulted a neurologist who diagnosed neuritis. A little later his case was studied very carefully by two well-known orthopedists who agreed that probably it was a neuritis—sciatica—but who abandoned the idea a few days later, admitting themselves puzzled. Next, he was seen by another neurologist who offered no opinion at all, but who advised the rest cure. How willingly the patient took to this treatment may be imagined, since he was having so much pain at the time that he was not able to lie down, and for a period of one year had not once been in bed. During the year 1918 he went from one physician to another, as he had been doing the year before. He had his spinal fluid examined, also his blood, but always with negative findings. Under the impression that it might be a neuritis, search was made for a focal infection. His teeth were extracted and his tonsils removed. X-rays of the spine, of the colon, of the gall-bladder, of the ureters and kidneys, and of the bladder were made, all to no purpose, except that nothing was revealed thereby. The pain during this time (always on the left side and in the same place), was so bad that the patient was not able to lie down and sleep. Only when sitting or standing was he able to find relief. Sedatives, other than morphine, had no effect, and for a period of six months he took from half a grain to one grain of the drug daily. When told that he had developed a drug habit, he declared he would break it; and he did, stopping its use altogether after eight days. Still others saw him before he came to Dr. Mann, one of the last physicians venturing the opinion that some local condition in the spine was the cause of all his pain. At any rate, x-ray plates showed a slight enlargement of the twelfth dorsal spine with a thinning of the corresponding vertebral body. Dr. Mann suggested that the spinal cord be laid bare, and, if nothing definite revealed itself then, the dorsal nerve roots be cut. The operation was performed the following morning. The laminae were removed from the upper three lumbar and the lower

three dorsal vertebrae. The dura seemed normal. It was opened. The cord felt harder and fuller than normal. At the level of the twelfth dorsal vertebral body there was gradually exposed in the pia a tumor larger than the lumbar enlargement of the cord. It extended from near the top of the twelfth dorsal to the first lumbar body, $1\frac{1}{8}$ in. by $\frac{5}{8}$ in. by $\frac{3}{4}$ in., actual measurement. It lay at the back of the cord with some of the dorsal nerve root bundles running over it and about it. Besides the peculiarity of the twelfth dorsal vertebra, there was also an anomaly of the cord. It was shorter than normal and ended near the middle of the twelfth body instead of at the bottom of the second or the top of the third lumbar, so that the upper portion of the tumor lay on the back of the conus at the lower part of the lumbar enlargement of the cord, and the lower portion lay in the cauda equina. The tumor shelled out with comparative ease on gentle, blunt dissection, with three small, dorsal nerve bundles cut and left still attached loosely to the spinal cord. Microscopic examination should determine the definite relations of the tumor to the nerve bundles and to the cord. Evidently it had developed in the pia. The tumor is cylindrical in form, of grayish mucoid color, and spotted with yellow flakes which vary in size from a pin head to a pea. The color has changed somewhat since being treated with formalin, so that it is more yellow. A careful microscopic study of the tumor will be made. The patient felt improved the same day of operation, and shows further improvement after seven days.

At this meeting two names were proposed for membership, i. e., Dr. Angus W. Morrison, Minneapolis, endorsed by Drs. Cross, Roberts and Abbott; and Dr. Harry B. Zimmerman, St. Paul, recommended by Drs. Daugherty, Rogers, and Leavitt.

F. E. LEAVITT,
Secretary.

ASSOCIATIONS OF MILITARY SURGEONS OF THE UNITED STATES

The twenty-eighth annual meeting of The Association of Military Surgeons of the United States will be held at New Orleans, La., April 22nd to 24th, with headquarters at the Hotel Grunewald.

Three sessions daily will be held and at these addresses will be made on pertinent topics by members of the association and discussed at the meetings. In spite of the name of the association, the topics dealt with do not confine themselves absolutely to the field of military surgery. That this is so is easily understood as the fact of a man's being in the service does not divorce him from the ordinary problems of the practice of medicine. This meeting occurs immediately prior to that of the American Medical Association whose meeting begins on the 26th and it is hoped that many of those who expect to attend the latter meeting may arrange their plans so as to take in our meeting as well.

It is desired to invite attention to the fact which is not generally understood by medical men of the coun-

try that practitioners in medicine are welcome at any of the sessions of the association even though they be not members themselves. It is the desire of the association to have the medical profession of the country conversant with the work which is being done by The Association of Military Surgeons and we feel that in this way they may very readily become acquainted with it.

Any further information relative to this meeting may be obtained by addressing The Secretary, Army Medical Museum, Washington, D. C.

OF GENERAL INTEREST

Dr. Merton Field of St. Peter has moved to Northfield.

Dr. A. C. Lindberg of North Branch has moved to New York.

Dr. L. J. Gaffney was appointed county physician for the sixth district.

Dr. H. H. Holm of the City Hospital of Minneapolis has located at Glencoe.

Dr. E. W. Johnson was reappointed as county physician for Beltrami County.

Dr. L. L. Elliott recently discharged from the service has located at Warroad.

Dr. Russell M. Wilcox of Minneapolis has gone to Florida for several weeks stay.

Dr. J. A. Sanford of Northfield was appointed county physician for the fifth district.

Dr. Thomas Lowe, Jr. of the Northwestern Hospital in Minneapolis has located at Pipestone.

Dr. Warner Workman of Tracy was made Lieutenant-colonel in the medical reserve corps.

Dr. E. H. Marcum of Bemidji has been commissioned a major in the medical reserve corps.

Dr. Ott has joined the Mayo Clinic and will assist Dr. Adson in the Section of Neurologic Surgery.

Dr. A. A. Meyer of Osakis has located at Sauk Center and will be associated with Dr. P. A. Hilbert.

Dr. Charles Robilliard of Faribault has returned from Boston where he took a special medical course.

Dr. G. L. Jacquet of Ivanhoe has gone to Boston to take special work in diseases of the eye, ear, nose and throat.

Dr. William A. Lee of Underwood has moved to Fergus Falls and will be associated with Drs. Baker and Burnap.

The surgical department, college of medicine, University of Minnesota, was bequeathed \$40,000 by the will of Howard W. Baker.

Dr. C. J. Robertson of Grove City will be located at Great Lakes where he will be in the military medical service with rank of lieutenant.

Dr. C. L. Martin has resigned his fellowship in the Mayo Foundation to take charge of the surgical work in a general hospital at Wayne, Neb.

Dr. L. M. Keene of Alexandria has located at Waverly. Dr. Keene was recently commissioned a Captain in the medical reserve corps.

Dr. J. C. McRae has been granted a year's leave of absence from the Mayo Foundation to accept a commission with the American Red Cross.

Dr. Otteraaen, from the Institute of Infectious Diseases, Chicago, has entered the Mayo Clinic for special graduate work in medical photography and clinical pathology.

Dr. R. Dominguez of Cauca, Columbia, who is a graduate of the University of Bogota, is now at the Mayo Clinic for a few month's special work in clinical pathology.

Dr. Hugh S. Cumming of Hampton, Va., was nominated Surgeon General of the Public Health Service. He succeeds Dr. Rupert Blue whose term expired on January 15th.

Dr. Carl D. Kolset of Benson has recently received the appointment of acting assistant surgeon and medical examiner for Swift county by the U. S. Public Health Service.

Dr. William J. Mayo of Rochester has returned from South America. Dr. Mayo visited the national colleges in Peru, Chili and Uruguay to determine the eligibility of South American surgeons for admittance to the American College of Surgeons.

Dr. A. L. Lockwood is now first assistant in thoracic surgery with Dr. Hedblom at the Mayo Clinic. After two years of private practice Dr. Lockwood went abroad for graduate study in Heidelberg and Berlin where he was at the outbreak of the war. He joined the British forces and during his service in the R. A. M. C. received his majority.

Dr. Hundling, a fellow on the Mayo Foundation, has received a Medal of Appreciation from the Royal Government of Jugo-Slavia. The parchment which accompanied the medal is signed by the Minister of the Interior and the chief of the Army Medical Corps. Dr. Hundling served with the American Red Cross in Serbia after his service in the U. S. Army Medical Corps.

The Weum Hospital at South Haven, Minnesota, has recently been reopened under the name of 'The Community Hospital' with Dr. C. L. Roholt as resident physician. Dr. T. W. Weum of Minneapolis will remain on the staff as consulting surgeon. The Hospital has been closed since Dr. Weum moved to Minneapolis in 1918 to limit his practice to Obstetrics, Gynecology and Abdominal Surgery.

Dr. Clifford E. Ekelund of St. Paul is located in the district about Kowel, Poland. He has been having some experience in the fight against cholera and is reported as having had some difficulty overcoming prejudice against vaccination. Forced vaccination by Russian authorities during the war and serious results due to improper sterilization had naturally antagonized the local population.

February 14, 1920 was the fiftieth anniversary of

the organization of the Ramsey County Medical Society in St. Paul. Eleven doctors were present at the first meeting for organization and the following officers were elected: Dr. D. W. Hand, president; Dr. A. Wharton, vice-president; Dr. William Banks, corresponding secretary; Dr. C. H. Boardman, recording secretary; Dr. S. D. Flagg, treasurer.

The younger physicians of Minneapolis have organized a society to be known as the Minneapolis Clinical Club, for the presentation and study of the original work of its members, one of the requirements of admission being the presentation of a thesis by the newly elected members. The following officers were elected: President, Dr. Stanley Maxeiner; Vice-President, Dr. Clifford Boreen and Secretary-Treasurer, Dr. Floyd O. Woodward. Meetings will be held monthly.

A germ known as the bacterium *tularensis* was first isolated by Drs. McCoy and Chapin of the U. S. P. H. S. and identified as the cause of a plague-like disease of rodents. Surgeon Edward Francis has recently found this bacterium to be the cause of "deer-fly fever," a disease occurring among the rural population of Utah. It is known to be due to a fly bite, the site and neighboring lymph glands become tender and inflamed and suppuration commonly follows. A fever resembling that of a septicemia may last three to six weeks. The first fatal case was reported in 1919.

The Carnegie Corporation of New York has announced its purpose to give \$5,000,000 for the use of the National Academy of Sciences and the National Research Council. It is understood that a portion of the money will be used to erect in Washington a home of suitable architectural dignity for the two beneficiary organizations. The remainder will be placed in the hands of the Academy, which enjoys a federal charter, to be used as a permanent endowment for the National Research Council. This impressive gift is a fitting supplement to Mr. Carnegie's great contributions to science and industry.

The Council is a democratic organization based upon some forty of the great scientific and engineering societies of the country, which elect delegates to its constituent Divisions. It is not supported or controlled by the government, differing in this respect from other similar organizations established since the beginning of the war in England, Italy, Japan, Canada, and Australia. It intends, if possible to achieve in a democracy and by democratic methods the great scientific results which the Germans achieved by autocratic methods in an autocracy while avoiding the obnoxious features of the autocratic regime.

The Council was organized in 1916 as a measure of national preparedness and its efforts during the war were mostly confined to assisting the government in the solution of pressing war-time problems involving scientific investigation. Reorganized since the war on a peace-time footing, it is now attempting to stimulate and promote scientific research in agriculture, medicine, and industry, and in every field of pure science. The war afforded a convincing demonstration of the dependence of modern nations upon scientific achievement, and nothing is more certain than that the United States will ultimately fall behind in its competition with the other great peoples of the world unless there be persistent and energetic effort expended to foster scientific discovery.

LOCUM TENENS desired from April 10 to July 1, 1920. Applicant is a University of Minnesota graduate, has had internship at the City and County Hospital, and has a State Board Certificate. Address Dr. Arthur H. Pederson, City and County Hospital, St. Paul, Minn.

OBITUARY

DR. PARKER L. BERGE

Dr. Parker L. Berge of Brainerd died January 22nd at the age of 32 years, after a long illness due to heart trouble. Dr. Berge was a graduate of Carleton College and the University of Minnesota and for four years was associated with Dr. J. A. Thabes in Brainerd. He was in the war service two years, being a surgeon in the aviation corps. A widow survives him.

DR. H. L. MCKINSTRY

Dr. H. L. McKinstry died at the home of his daughter in Granite Falls on Feb. 7th. Dr. McKinstry was born in Mercersburg, Pa., June 4th, 1847 and was a graduate of the University of Pennsylvania. He came to Minnesota in 1875 and established medical offices at Zumbrota, later moving to Red Wing where he practiced for many years. Surviving the deceased are six children.

DR. H. G. HIEBER

Dr. H. G. Hieber of Thief River Falls died at Monrovia, Cal., Jan. 17th. Dr. Hieber was born in Black Hawk, Iowa, on Nov. 10, 1879. After going through the public schools at his birthplace he entered the Northwestern University, Chicago. After graduation he spent some time in post graduate work in Europe, coming to Thief River Falls in 1907. He was married in 1912 to Miss Beatrice Whitten of Anoka. His widow and one daughter survive him.



NEW AND NON-OFFICIAL REMEDIES

During February the following articles have been accepted by the Council on Pharmacy and Chemistry for inclusion in New and Nonofficial Remedies:

Nonproprietary Articles:

Eucatropine.

Phenacaine.

Gilliland Laboratories:

Gonococcus Vaccine (Polyvalent) (Gilliland).

Staphylococcus Vaccine (Albus and Aureus) (Gilliland).

Werner Drug and Chemical Co.:

Eucatropine-Werner.

Phenacaine-Werner.

Pasteur Anti-Rabic Vaccine (Gilliland).—An anti-rabic vaccine (see New and Nonofficial Remedies, 1920, p. 272.) prepared according to the method of the U. S. Public Health Service. The treatment consists of twenty-one to twenty-four doses and these are sent separately each day by special delivery. The Gilliland Laboratories, Ambler, Pa.

Pneumococcus Vaccine Immunizing (Gilliland).—A pneumococcus vaccine (see New and Nonofficial Remedies, 1920, p. 286.) containing Types I, II and III, respectively, in equal proportions. Marketed in packages of four 1 Cc. syringes and also in packages of four 1 Cc. ampules, containing 250, 500, 1,000 and 2,000 million killed pneumococci per Cc. The Gilliland Laboratories, Ambler, Pa.

Staphylococcus Vaccine (Albus and Aureus) (Gilliland).—A staphylococcus vaccine (see New and Nonofficial Remedies, 1920, p. 288.) containing *Staphylococcus albus* and *Staphylococcus aureus* in equal proportions. It is marketed in packages of four syringes containing, respectively, 250, 500, 1,000 and 2,000 million killed bacteria in 1 Cc.; also marketed in packages of four ampules containing, respectively, 250, 500, 1,000 and 2,000 million killed bacteria in 1 Cc. The Gilliland Laboratories, Ambler, Pa. (Jour. A. M. A., Feb. 7, 1920, p. 393).

Chloroxyl.—Cinchophen Hydrochloride.—Phenylcinchoninic Acid Hydrochloride.—The actions, uses and dosage are the same as those of cinchophen (see New and Nonofficial Remedies, 1920, p. 224 under Phenylcinchoninic Acid (Cinchophen) and Phenylcinchoninic Acid Derivatives). Chloroxyl is a yellow crystalline powder with an astringent, slightly bitter taste, insoluble in water. Chloroxyl is also supplied in the form of Chloroxyl Tablets 5 grains. Eli Lilly and Co., Indianapolis, Ind. (Jour. A. M. A., Feb. 14, 1920, p. 461).

PROPAGANDA FOR REFORM

Grale's Fruit Laxative.—This is advertised with the claim: "Grale's Fruit Laxative contains only figs, dates, raisins and prunes, a few simple herbs and bran. NO DRUGS AT ALL." Though claimed to

contain no drug, the A. M. A. Chemical Laboratory reports that the preparation was found to contain ground senna. Since senna is a well-known drug of recognized activity, the claim that the preparation contains no drug is false (Jour. A. M. A., Feb. 7, 1920, p. 410).

Dionol.—The Glorified Petrolatum.—The exploitation of Dionol is based on the theory: (1) The brain is a generator of neuro-electricity; (2) The nerves are the conductors of this electricity; (3) The nerve sheaths are the insulators; (4) Wherever there is local inflammation, the nerves are short circuited owing to a breaking down of the insulation resistance of the nerve sheaths; (5) This results in "an escape of neuro-electricity"; (6) Dionol coats the nerve sheaths with a nonconducting layer, and this restores the insulation and "stops the leak." Whether this theory was invented to give a "reason for being" for Dionol, or whether Dionol was first invented and it became necessary to evolve a theory that would give some plausibility to the claims made for this etherealized petrolatum, we are unable to say. In any case, the theory and the product are exploited together. The value of the "case reports" sent out for Dionol may be estimated from a report featured under the heading "Infected Wound....." signed "Dr. W." This "Dr." appears to be an osteopath whose specialty, according to his advertisement in his local newspaper, is "Catarrhal Deafness and Hay Fever, Acute and Chronic Diseases" (Jour. A. M. A., Feb. 7, 1920, p. 410).

Hypno-Bromic Compound.—A Vermont physician reports that Hypno-Bromic Compound, manufactured by H. K. Wampole and Co., is sold by druggists without prescription, though it contains in each ounce: cannabis indica, 1 grain; morphine, $\frac{1}{4}$ grain; potassium bromid, 48 grains; hyoscyamus, 1 grain; chloral hydrate, 96 grains. He writes that he has three young women who have become addicts to the preparation as a result of thoughtless prescriptions from physicians. By visiting the various drug stores in town, these addicts have been able to obtain an ample supply of the preparation. Hypno-Bromic Compound is more than an unscientific mixture: it is a dangerous product that should not be sold indiscriminately over the drug counter. Physicians who prescribe such mixtures and druggists who indiscriminately sell such stuff are disgracing two honorable professions (Jour. A. M. A., Feb. 7, 1920, p. 410).

Eupad and Eusol.—Eupad is a powder composed of equal parts by weight of boric acid and chlorinated lime (containing 25 per cent available chlorine). Eusol is thus made: (a) 25 gm. of eupad are shaken with 1 liter of water, allowed to stand for some hours and filtered. (2) To 1 liter of water add 12.5 gm. chlorinated lime (25 per cent chlorine), shake vigorously, and add 12.5 gm. boric acid in powder and shake again. Allow to stand, decant and filter. If the official chlorinated lime containing 30 per cent available chlorine is used, a proportion-

ately smaller quantity should be sufficient (Jour. A. M. A., Feb. 7, 1920, p. 413).

Influenza Vaccines.—The *Medico-Military Review*, a semi-monthly mimeographed publication sent to medical officers of the Army by the Surgeon-General's Office, has the following on the use of vaccines against influenza: "YOU ARE REMINDED that so far, a comprehensive analysis of results obtained by the use of monovalent and polyvalent vaccines in the prevention of influenza has not demonstrated their value. Much carefully controlled experimental work is now being carried out on this subject both in civil institutions and in the Army, and any worthwhile advances will be reported in the Review from time to time. If a prospective vaccine is developed, it will be prepared at the Army Medical School for general distribution and all medical officers will be duly notified. The general use of the present commercial polyvalent protective against influenza is not considered desirable. Numerous telegrams and other requisitions are being received for influenza vaccine. In view of the fact that no prophylactic influenza vaccine is available, such requisitions should be discontinued" (Jour. A. M. A., Feb. 14, 1920, p. 466).

Auto-Hemic Serum.—This is an asserted cure for laziness, ugliness, frigidity and many other things. For many years L. D. Rogers, the discoverer of Auto-Hemic Serum, was the chief owner of the National Medical University of Chicago—a low grade school of the "sun-down" variety now out of existence. A few years ago, Rogers was exploiting a cancer serum and selling shares in the "Cancer Research Laboratory and Hospital." In 1915, he exploited a Japanese consumption cure. Then came Auto-Hemic Serum, exploited by means of "The National Society of Auto-Hemic Practitioners" and the "North American Journal of Homeopathy" the official organ of the "Auto-Hemic Practitioners" and of the "American Medical Union." Auto-Hemic Therapy is described as "The Missing Link in Medicine" and "consists in giving the patient a solution made by attenuating, hemolizing, incubating and potentizing a few drops of his or her own blood and administering it according to a refined technic developed by the author." The "technic" of this new therapy may be learned through a mail order course costing one hundred dollars, "cash-in-advance." One of the chief virtues claimed for the serum is that of developing in the patient who takes it an unbounded energy; it apparently makes him want to work himself to death (Jour. A. M. A., Feb. 14, 1920, p. 477).

Eumictine.—The Council on Pharmacy and Chemistry reports that Eumictine is ineligible for New and Nonofficial Remedies because (1) it is unscientific; (2) it is sold under unwarranted therapeutic claims; (3) the name "Eumictine" is blown in the bottle for the obvious purpose of bringing the product to the attention of the public when it is prescribed in the original package, and (4) the name is therapeutically suggestive and not in any way descriptive of its composition. Eumictine is a prepara-

tion from the laboratories of Maurice Le Prince, Paris, France, and is marketed in this country by George J. Wallau, Inc., New York. According to the American agent, "each capsule is supposed to contain 20 centigrams of Santalol, 5 centigrams of Hexamethylene-Tetramine" (Jour. A. M. A., Feb. 21, 1920, p. 542).

Du Pont Cotton Process Ether.—Recently the "News Service" of the E. I. Du Pont De Nemours and Co., Inc., circularized the press of the country with a "filler" about "The New Du Pont Ether." The Du Pont Ether and the claims made for it are seemingly based on the work of one man, James H. Cotton, M. A., M. D., Toronto, Canada, who published an article on "Cotton Process Ether and Ether Analgesia." However, Cotton did not give the composition of the "New" ether, nor does his work appear to have been corroborated. In reply to an inquiry from the Secretary of the Council on Pharmacy and Chemistry, the Du Pont Chemical Works declared that the "procedure of manufacture, and the exact composition" of the ether was regarded as confidential information. The use of a therapeutic agent of unknown composition is unscientific and contrary to the best interests of the medical profession and the public, but it is many times more serious for physicians to use a secret or semisecret substance as an anesthetic.

Barbital (Veronal) Addicton.—The constant use of even small doses of barbital (veronal) affects the central nervous system. Those taking the drug habitually become much debilitated and seem less able to stand moderate doses. Death has occurred from a 3 gm. dose in addicts (Jour. A. M. A., Feb. 21, 1920, p. 544).

Antiplasma.—A nostrum called Antiplasma or Rudolph's Malarial Specific is being exploited in the South. It is claimed that the preparation was "developed by J. J. Rudolph, M. D." and that "There is only one way to cure Malarial Fever. Take 15 drops of Rudolph's Malarial Specific on sugar or in molasses, three times daily for six days." The A. M. A. Chemical Laboratory reports that Antiplasma is a pale yellow, viscid liquid having an odor resembling a mixture of oil of turpentine and oil of wintergreen. The preparation responded to tests for rosin, turpentine and methyl salicylate. It was impossible to determine whether the product was a mixture of the three, or some natural turpentine-like product "thinned" with methyl salicylate. The chemists conclude that a mixture of 53 parts of bleached rosin, 41 parts of oil of turpentine and 6 parts of methyl salicylate would probably have whatever anti-malarial properties Antiplasma possesses (Jour. A. M. A., Feb. 28, 1920, p. 618).

Pharmacy by Act of Congress.—For years the manufacturers of "patent medicines" have assured us that the alcohol in their nostrums was used only as a solvent, preservative or extractive agent. Thus Wine of Cardui at one time contained 20 per cent of alcohol and the manufacturer claimed that no

more was used than was needed as a solvent and preservative, and that attempts to substitute another preservative had proved futile. Then came national prohibition and now Wine of Cardui contains 10 per cent of alcohol and its preservative powers have been fortified by the addition of benzoates (Jour. A. M. A., Feb. 28, 1920, p. 607).

CORRESPONDENCE

COMMUNICATION

"To all physicians who served the Federal Government during the War:

"An association of Medical Veterans of the World War was organized at Atlantic City, in June, 1919, at the time of the meeting of the American Medical Association, and a constitution and by-laws adopted. About 2,800 physicians have already joined and all others who are eligible are invited to join the society.

"The Constitution states that 'The Dominant Purpose of this Association Shall Be Patriotic Service. The objects of this association shall be: To prepare and preserve historical data concerning the medical history of the war; to cement the bonds of friendship formed in the service; to perpetuate the memory of our medical comrades who made the supreme sacrifice in this war; to provide opportunity for social intercourse and mutual improvement among its members; to do all in our power to make effective in civil life the medical lessons of the war, both for the betterment of the public health and in order that preparedness of the medical profession for possible war may be assured.'

"The organization of the society provides for state and local organizations wherever the members desire it, and in some states, such as Wisconsin, organization has already been effected.

"It is desired by the National association that those who are already members meet together in larger and smaller groups, at the first convenient opportunity, and effect a local organization with a chairman and secretary, and also at the next meeting of the state medical society that a place be provided on the program for the Medical Veterans.

"The organization of the society is based on democratic principles and it is hoped that the members who have already joined will take the initiative and organize their own state and local societies.

"The national organization will assist by furnishing application blanks and copies of the constitution and by-laws, and, if desired, stationery.

"The first things to be done after the organization of a state society is effected is to elect a councilor to the general council of the organization, to represent the state society at the next annual meeting of the Veterans at New Orleans on the first day of the meeting of the American Medical Association, April 26, 1920.

"A badge or button for members of the society is being made and will soon be ready for distribution."

Yours very sincerely,

F. F. RUSSELL,
Secretary.

Army Medical School, Washington, D. C.

WHY TUBERCULOUS PERSONS WITHOUT FUNDS SHOULD NOT LEAVE THEIR HOME STATES

It is reliably estimated that several hundred tuberculous persons without funds come to Denver every year. Practically all of them come because they have the mistaken idea that climate will cure tuberculosis.

They arrive, almost penniless, without having made any inquiries, or any provisions for their needs. Since Colorado has no state, and Denver no municipal tuberculosis sanatorium (merely a ward at the County Hospital for thirty-five very sick tuberculous residents), the care of such indigent persons is limited to a few free private sanatoria, which are continuously so overtaxed that admittance is a long and difficult matter. These sanatoria comprise: the two Jewish, which accept only a small number of Gentiles; a tent colony of men with a capacity for seventy "down-and-outers"; and a small home for a dozen destitute tuberculous women.

These tuberculous poor who migrate to Denver, finding no place where they can be cared for, look for light work in order to maintain themselves and often their dependent families; but the demand for such work is far in excess of the supply. Driven to any work they can get, with neither friends nor care, anxious, homesick, hopeless, they rapidly grow worse, and usually soon die. They die for lack of proper rest, food, fresh air, and medical attention, those essentials of treatment, which many of them could have had at home—or here with sufficient funds for two years' care. Without these essentials climate is of no avail. If it were, Denver would welcome these tragic health-seekers instead of urging them, for their own best chances, to stay at home.

Denver also urges that the states throughout the country plan definite programs to retain their indigent tuberculous, giving them effective treatment in state sanatoria or in their own homes.

THE DENVER ANTI-TUBERCULOSIS SOCIETY,

221 Coronado Building, Denver, Colorado.

Editor Minnesota Medicine,
St. Paul, Minn.

Dear Sir:

I am arranging for a party to go to New Orleans for the meeting of the A. M. A., going down by boat, to return by rail. If a party of sufficient size can be made up, the boat will be held at New Orleans for sleeping quarters and to serve breakfasts while in

port. A special train will take the party back through the Ozark Mountains.

The details have not as yet been worked out, and they will depend largely on the size of the party. Those interested may get the details by corresponding with me.

HARRY F. THOMPSON, M. D.,
Forest City, Iowa.

PROGRESS IN MEDICINE AND SURGERY

THE ACUTE ABDOMEN: Deaver (Surg. Gyn. and Ob. Vol. 30 No. 1.) points out that the acute abdomen occupies too prominent a place in mortality statistics, and among the reasons for this is the fact that too many untimely and unsuitable operations are performed in the treatment of this serious condition. So it is also in part due to the want of an intimate knowledge of living surgical pathology, in part to a too great reliance on laboratory findings, which do not always correspond to the findings at the autopsy, and furthermore, to a hesitancy to resort to radical measures in the hope the symptoms may pass away under what is called conservative treatment. Radical treatment in such instances would have been truly conservative, because it generally would have conserved life.

The acute abdomen is not, as a rule, the result of virgin pathology. In the majority of instances, it is only the outcome of a chronic pathological process, which has given evidence of its presence for a well marked period of time. The more common of the causes should be recognized, if our patients are carefully studied and examined and our faith has not been perverted as entertaining the foolish belief that chronic ulcer, chronic gall-bladder disease, chronic pancreatitis, etc., can be cured by medicine, diet, visiting one of the famous springs, taking a rest-cure, etc. The traumatic acute abdomen, the wall of which shows a penetration, whatever the laceration, and whatever the agent, should be opened.

Perforations of the gastric-intestinal tube are usually easy to diagnose because of the intense and sudden pain and the early board-like rigidity to which they give rise. But in such varieties of perforation as those occurring in typhoid, particularly the ambulatory type, or the perforation of an unsuspected ulcer of the colon, an exact anatomical diagnosis often cannot be made in time to save the patient's life. The important point is to recognize the presence of an acute abdominal catastrophe and let the exact diagnosis follow upon the revelations of the aseptic scalpel.

There are to be sure certain acute conditions of the abdomen in which surgery is not indicated, and it is these the author places among the "untimely" operations which swell our mortality lists. Promi-

nent among them are, acute dilation of the stomach, acute gastro-enteritis, which may simulate appendicitis, pneumonia and diaphragmatic pleurisy causing upper addominal rigidity and referred abdominal pains. After considering all contra-indications to surgery and all conditions, which simulate acute surgical conditions of the abdomen the greatest toll of life is exacted as a result of delay in diagnosis and instituting proper treatment.

The three dependable conditions necessary for the determination for or against operation are first, experience; second, interpretations of a carefully elicited history, although not feasible in all instances on account of the inability of the patient to express himself; third, carefully examination.

In the decision whether and when to operate we must remember certain facts in the natural course of abdominal inflammation, namely: All perforated inflammations tend to generalize; appendicular inflammations have a strong natural tendency to localize and so do cholecystic and pelvic inflammations. Generalization in these cases is usually the result of improper treatment.

E. M. JONES.

MACULAR HOLE IN THE RETINA: A. B. Middleton, M. D. (Am. Jour. of Ophth., Nov. 1919, Vol. 2, No. 1.) The examination of recruits preparatory to the formation of our great American army has brought out many statistics relating to the various specialities in medicine and it is hoped that as time goes on many more of these rare and interesting pictures of disease will be collected together.

In a most enlightening article upon this subject heretofore considered quite rare the author reports and tabulates histories of cases discovered during the examination of recruits suspected of malingering to avoid military service.

Out of 100,000 men examined, Middleton found 23 who had a hole in the retina at the macula region; in the series 17 cases had round retinal holes and the balance elliptical shaped holes, the long axis being horizontal, the colour of the exposed choroid in the bottom of a retinal hole at the macula varied between a light and a dark cherry red, as a rule there is a halo of pigment in the retinal hole varying in density; a central scotoma is present depending upon the size of the retinal hole.

In this series a greater percentage of retinal hole occurred among the colored recruits than among the whites but it is the authors opinion that given the same environment there would be little difference between the two races.

The article gives complete case histories of each case. All were due to a direct blow upon the eye. Vision in the effected eye was 20/200 while in the uninjured eye it was 20/20. All cases in the series had a dilated pupil of the affected eye which slowly reacted towards light and accommodations and showed retarded power of convergence. In none was

there evidence of fluid vitreous, dislocated lens, traumatic cataract, detached retina or optic nerve trophy.

The article has been illustrated with six colored prints. It would have been more interesting to have seen the entire series, for it is not often that rare conditions can be grouped in such numbers under one heading as this paper describes.

GEORGE C. DITTMAN.

W. H. Fisher, (Ann. Surg. Vol. 70, No. 6) reports a case of suppurative parotitis following a laparotomy for an ovarian cyst. He follows the presentation of this case with a collective abstract on suppurative parotitis. LeDentu advises very early incision in cases of paratititis to avoid massive necrosis of the gland. Because of the dense facial investment and the trabeculae of fibrous tissue extending deeply into the gland so dividing it into lobes, infection may develop in one of these compartments and because of the unresistant nature of this facial investment an actual ischemic necrosis of the parotid may take place. Therefore it is important to incise early and open all these fibrous cavities. The author has made extensive inquiries from surgeons who see a great many traumatisms in the region of the parotid. He found from these inquiries that suppuration rarely if ever followed an injury.

Extension and badly infected mouths by means of Stenson's duct almost never occurs. Although Fenwick reports that in cases of cachexia and malnutrition where rectal feeding was done, suppuration of the parotid often took place. He laid this to stasis of the secretion in the gland and to obviate infection, he would stimulate parotid secretion by having the patient chew on a piece of rubber before each rectal feeding. The physica nerve which prompts salivary secretion is often disturbed by shock or the anaesthesia in surgical operations and the inhibition of these stimuli causes a stasis in the parotid which makes it more susceptible to infection. This associated with a bacteriemia is probably the reason for postoperative suppurative parotitis. The conclusions drawn from clinical observation and a careful review of the literature are

1. Suppurative parotitis is of hematogenous origin.
2. That cachexia and malnutrition are predisposing factors.
3. That susceptibility is favored by stasis.
4. That secretion of the gland is under the influence of nerve stimuli and that the incidents of post-operative parotid involvement is neurally dependent upon surgical shock or inhibition of the secretory and trophic fibres from higher psychic centers.
5. That the gland must be susceptible to pyogenic microorganisms and when affected bacteriemia exists in all cases.
6. That early incision and drainage are indicated.

7. That the surgical technique advised by Lillienthal and Blair should be employed.

H. B. ZIMMERMAN.

SYPHILIS OF THE LUNG. H. Lissner (Am. Jour. Med. Sc., March 1918.) believes that while syphilis of the lung is not common it is by no means rare and is really much more frequent than is usually recognized. It is chiefly confused with phthisis, is usually very responsive to treatment—often producing brilliant cures—and if not treated is surely fatal.

Every case of apparent phthisis which shows no tubercle bacilli in the sputum should be suspected of having syphilis.

The roentgen-ray plate of a luetic lung is quite unlike that of a tuberculous lung, its chief characteristic being peribronchial thickening. Gummata do not present striking shadows but have to be differentiated from malignant growths.

Types include gummata, those showing connective tissue changes chiefly, and those showing parenchymatous changes chiefly.

Gummata may be single, multiple and vary in size and shape.

Fibroid induration is the chief type and most characteristic of lues of the lung.

Symptomatology:—The onset is insidious and rarely recognized until fully developed. This is not true of tuberculosis where we have toxic symptoms with anemia and reflex symptoms due to pneumogastric nerve action such as cough, tachycardia and gastric disorders.

In syphilis this is not true. The process is usually advanced before any change in general health is observed. Patient seems strong, color good, facies normal, appetite and weight remain; in other words, no symptoms of intoxication.

Dyspnea is the chief symptom and usually severe. Cough is spasmodic and exhausting. Sputum; almost none or abundant—negative for Koch's bacillus. Night sweats common. Fever variable.

Diagnosis: 1. Absence of tubercle bacilli in sputum.

2. Disproportion between the gravity of the physical signs, the severity of other symptoms, and the good appearance of the patient.

CHAS. N. HENSEL

THE CARDIAC PHASE OF THE WAR NEUROSES. A. E. Cohn (Am. Jour. Med. Sc. Vol. 158 No 4.) calls attention to the work done under the title of "The Irritable Heart of Soldiers" by Da Costa, an American. Da Costa described the symptoms of palpitation, cardiac pain, shortness of breath, and nervous disorders, such as headaches, giddiness, and disturbed sleep and called attention to the existence in these cases of hyperesthesia of the skin, blueness of the lips and hands, and a mottled condition of other portions of the skin. Indigestion, abdominal

distress, diarrhea, itching and sweating were also noted. Da Costa found mention of such symptoms having existed in the Crimean War, and frequently in the Northern Army in the Civil War.

The condition was recognized by the British in the last war, and in 1916 the Hamstead Military Hospital was set aside for cases of irritable hearts of soldiers. An advisory commission consisting of Drs. Allbutt, Mackenzie and Osler was appointed.

In this country two hundred beds were set aside at General Hospital No. 9 at Lakewood, N. J., and the work there was carried on by Major Peabody.

The author describes a severe case. The patient is obviously distressed, is likely to be thin and have a drawn look. His lips may have a bluish tinge, his skin appears mottled, and his hands purple. A gross tremor not only of the hands, but of the legs and body may be present. He complains of shortness of wind, pains in his chest, palpitation, fatigue or dizziness. On examination the skin feels wet and clammy, there is axillary sweating, hyperesthesia of the skin over the precorium and exaggerated tendon reflexes. The heart is not enlarged. The pulse usually ranges from 90 to 130, a small percent being below 80 and some over 150. The blood pressure shows no change. The breathing is shallow and may be as high as 40.

Mackenzie believed the condition to be one mainly of exhaustion, and injury not alone to the heart, but to the nervous system.

Lewis used the term "Effort Syndrome" for those showing these symptoms without sign of disease which, after all, follow any extreme muscular effort. The symptoms referred to may appear in chronic heart diseases, acute infectious disease, hyperthyroidism and peace neuroses.

The author states that he found heart murmurs in 50 per cent of a series of 214 soldiers who had seen hard overseas service and whom he examined. These murmurs were found twice as often in the recumbent position as in the standing. These murmurs were systolic or post-systolic, and heard at the apex. He calls attention to the fact that these murmurs and the roughening of the first sound sometimes heard when the heart-rate is rapid, of following exercise have often resulted in the faulty diagnosis of mitral stenosis.

Tachycardia, pain and shortness of breath sometimes follow acute arthritis, pneumonia, tuberculosis and typhoid and according to observers trench fever and influenza. Nervous symptoms do not as a rule co-exist, and these cases are not the same as those of irritable heart.

In hyperthyroidism the pulse and respiration do not fall during rest and sleep, and the tremor is fine. Basal metabolism is also increased. The contrary is true in the effort syndrome.

The expression in these cases of irritable heart resembles that of the anxiety neuroses, and some neurologists have made the diagnosis of neurasthenia.

The author goes on to show that this syndrome

may be dependent on heredity, personal history and constitutional predisposition. He states that the most timid individuals were soon eliminated on this side of the water, and that the less hardy were the next to develop this condition under the wear and tear of life at the front.

The British treated the condition as a neurosis, but used the term "Disordered Action of the Heart". In the American army the same treatment was imitated, but the term "Effort Syndrome" was borrowed from Lewis and applied.

The author concludes: "In his (Da Costa) view the disorder arose most often as the result of infectious diseases, was most likely a functional disorder, going on to organic change in heart, and was certainly affected beneficially by drugs. The symptoms which he described, and which we recognize are alike. We differ from him in that we think that no matter what the predisposing cause, whether it be infectious disease, malfunctioning glands or internal secretion or gas-poisoning, the disorder is essentially a neurosis, depending on anxiety and fear; that it is removed by the disappearance of the exciting cause and that it is cured by measures designed to influence the neurotic state.

ON THE NATURE OF ECLAMPSIA: By Isei Obata, from the Forensic Institute of the Imperial University of Tokio. (*Journal of Immunology*, May, 1919.)

One Dold discovered in the salt solution extract of viscera a poisonous property which can be neutralized by blood serum. This he called "Organgift," but the true nature and property of it has never been fully determined, however, although it has been investigated by many.

If we regard the placenta as an organ, possessing, perhaps, certain peculiarities, and if it is found to contain the poisonous properties referred to by Dold, it seemed to Obata possible that this poisonous property could, under certain peculiarities and conditions, be responsible for the pathology and symptom complex of eclampsia. This he undertook to find out.

The placental extract was prepared as follows:—Immediately after the expulsion of the placenta, the umbilical cord was cut off together with the adjacent part of the placenta; the blood was expressed and the decidua removed. A certain sized piece of cotyledon was cut into pieces and ground in a mortar, and a .85 per cent salt solution added in the proportion of 1:3 by weight. After stirring, it was allowed to stand one half hour at room temperature, then strained through a fine silk. The filtrate was centrifuged and the supernatant fluid, pale pink in color, and having no solid particles in suspension, was designated as placental extract and was the product used. Generally fresh placenta was used but on several occasions a 1-hour refrigerator product was substituted.

The animals used were the Japanese dancing mice, occasionally rabbits, and injections were made into the caudal veins.

"After the injection of a lethal dose of the extract there was an interval of ten to thirty seconds, rarely a minute, before, the animal became excited, and fell at once in a brief clonic or, rarely, tonic convulsion, which was succeeded by a violent dyspnoea, coma and finally death within one to three minutes after the beginning of the convulsion. While the symptoms just described occurred in the majority of instances there were occasional exceptions in which the effects were more prolonged, death following sometimes after hours or days. Even in these cases, however, two symptoms were always noticeable: namely, dyspnoea and convulsions."

Control and duplicate injections were made; it was definitely decided what was meant by a "lethal" dose, and ten hours was set as the limit of time any animal dying after that period of time or recovering from its symptoms was designated as "reaction," the others as "dead." It was soon found that the weight of the animal was not a factor.

The average lethal dose of the extract of fourteen placentae of normal women was from .025 to .15 cc. and the average of seven placentae of eclamptic women was from .019 to .1 cc. which lead the author to the conclusion that the toxic property of the two was not sufficient to distinguish between them.

In comparing the toxicity of the serum of normal and eclamptic individuals, the fresh serum was injected intravenously and it was found to be followed by toxic symptoms differing only in severity from those produced by the injection of the placental extract and coming on after a longer period of time after the injection.

Using the serum of men, non-gravid women, healthy gravaide, healthy puerperal and eclamptic women, he found that there was no significant difference in the toxicity of the serum of the different groups; nor between the serum of the eclamptic and that obtained after her recovery.

He then proceeds to compare the neutralizing power of the serum of normal and eclamptic women on the placental extract. To do this he took 1 cc. of the placental extract to which had been added from .7 to .025 cc. of serum and enough salt solution to make a quantity of 2 cc. and this was injected after an incubation period of one hour at 37 degrees. Taking again the serum of men, non-gravidae, healthy gravaide and healthy puerperal women, he found that their neutralizing power was remarkably uniform, it taking only from .2 to .3 cc. of the serum to neutralize the toxic property of the 1 cc. of the placental extract. However, in eclamptic women during the attack it took as much as .6 cc. of the serum to have the same effect; but the normal neutralizing power of the blood was restored in four or five days after the attack, it then requiring only from .3 to .4 cc.

This diminished neutralizing power of the serum might be cause or it might be effect; it might produce the convulsion or it might be produced by the convulsion. To determine this point, the serum of three rabbits was tested in regard to its neutralizing power before and after a convulsion produced by the injection of toxic placental extract, and it was found to be the same, so he concluded that, in the rabbit at least, the convulsions do not alter the neutralizing power of the serum.

In studying the comparative neutralizing power of the non-pregnant and the pregnant animals, he found them to be the same and so concluded that the power of the blood in this respect is not increased during pregnancy and this argues against an immunological origin of the neutralizing power of the blood.

He then proceeded to compare the pathological anatomy of the animals that were killed with injections of placental extract with that of eclampsia. He killed several mice and rabbits with large lethal doses of placental extract and found post-mortem a fairly marked agreement in the pathological anatomy of the two groups. In order to make the work more exact, however, he injected sub-lethal doses over a period of from seven to twelve days and his conclusions, stated verbatim are as follows: "From the preceding descriptions an agreement is apparent in the pathology of eclampsia and that of the animals killed with placental extract excepting the slighter alterations met with in the kidneys of the latter."

CONCLUSIONS: Since these experiments show that the serum of eclamptic women is reduced in its power to neutralize the toxin of placental extract, to regain its full power in four or five days after the attack; and since this reduced power has been shown not to be due to the convulsion; and since a marked agreement has been found to exist between the symptoms of placental extract poisoning and the eclamptic attack, and an almost perfect agreement in the pathological anatomy of the two conditions, the author concludes that "the true nature of eclampsia is nothing more than an intoxication by the placental poison which is made possible by a weakening in its normal capacity of neutralization on the part of the maternal blood."

The author admits that the symptoms and pathology revealed by these experiments are not peculiar to placental extract poisoning, but he argues that in eclampsia that the toxin should come from the placenta seems to be supported by the fact that the symptoms cease when the placenta is eliminated.

That we do have a post-partum eclampsia is true, but rarely after 24 hours, and the symptoms of placental extract poisoning in some cases did not show themselves until ten hours after injection. These late eclamptic manifestations may also be due to the process of involution as even the uterus has been found to contain this "Organgift."

The author is still investigating the question

of why or what reduces the neutralizing power of eclamptic blood.

Then follows a very interesting and instructive historical review, with comments by the author, of the various theories concerning eclampsia that have been advanced from time to time.

1. The theory of uraemia which is no longer tenable as the two differ in clinical symptoms and in respect to the blood findings. An accumulation of urinary products is not demonstrable in the blood of the eclamptic.

2. The theory of a reflex effect of pressure in the pelvis of the kidney, produced, primarily, by the pressure on the ureter at the brim of the pelvis by the head of the fetus. Eclampsia often takes place when the head of the fetus is not in a position to make pressure on the ureter.

3. Bacterial theory. One Gerdes isolated from the placental site of the uterus of eclamptic women an organism which he designated *Bacillus Eclamptica*, but which Hofmeister recognized as the proteus vulgaris.

4. Zweifel suggested an intoxication by lactic acid which he found in the urine and serum of eclamptic women, and because he found it in gravidae who were nephritics he concluded that it was not caused by the convulsions. This does not hold as increased lactic acid is found in women suffering from nephritis, not from eclampsia.

5. In the category of uraemic and lactic acid intoxications might be placed acetone and creatinin poisoning, both of which views are lacking in proof.

6. Autointoxication caused by metabolic products. If the liver is normal and carries on its functions, all metabolic toxins are thoroughly neutralized but when it is not normal these toxins accumulate, which would make the serum of the eclamptic, or even the pregnant woman, more toxic than the normal—a conclusion not confirmed by the present investigations.

7. Kollmann and Dienst found a large excess of fibrin in the blood of the eclamptic woman which they thought was due to globulin from the fetus and retained in the maternal blood because of imperfect kidney function. This would make the serum of eclamptic women more toxic than that of normal women, a requirement not met by facts. Furthermore, Lamsback collected from the literature 63 cases of eclampsia occurring after the death of the fetus, in nine of which the uterus was not occupied by a fetus at all but by a hydatiform mole.

8. The above argues against the theory of Kinoshits who produced eclamptic symptoms followed by death in animals by injecting the albumin-free extract of the animal fetus. This substance he called "eclampsin."

9. The placenta received its share of attention. Veit, after he showed that syncytial cells actually gained access of maternal circulation, expressed fluid from the placenta and injected it into rabbits which later developed albuminuria. He observed

that the serum of such a rabbit acquired the property of dissolving these syncytial cells which he attributed to an immunological product called "syncytiolysin". He assumed that when eclampsia developed it was due to the fact that the syncytial cells entered the maternal circulation faster than they could be taken care of by the process of syncytiolysin, and when they entered more slowly an albuminuria developed. If this is true then the serum of the pregnant woman should show a greater neutralizing power against placenta extract poison than that of man or the non-pregnant woman, a requirement not fulfilled in the present investigations.

10. Liepmann found that when he made a salt solution emulsion of the placenta of eclamptic women and injected it into the abdominal cavity of rabbits that it was especially toxic. This is not confirmed in the present investigation.

11. Weichardt assumed that antibodies in the maternal blood stream dissolve placental cells and liberate a toxine called "syncytiotoxine". Normal blood possesses an antitoxine mechanism which is disturbed in eclampsia. This theory is strongly supported by the present investigations and experiments for the latter show, for the first time, a great difference in the neutralizing power of the serum of normal and eclamptic women against placental extracts.

12. Hofbauer claimed that eclampsia was an intoxication due to a substance derived from the liver by a process of autolysis under the influence of a ferment produced in the placenta and discharged into the maternal blood. This requires that the blood of eclamptic persons should be more toxic than that of normal persons which is not supported by the present experiments.

13. Many observers believe that anaphylaxis is induced, during pregnancy, by fetal serum, placenta or amniotic fluid. There is much doubt expressed as to the correctness of this theory.

ALBERT G. SCHULZE.

DIAGNOSTIC SIGNIFICANCE OF THE FIRST SOUNDS OF THE HEART: Le Roy Crummer, M. D. (*Am. Jour. Med. Sc.* Vol. 159, No. 1.) calls attention to the importance of heart sounds as distinguished from murmurs.

Murmurs are of less diagnostic value than they used to be. The author points out the difference in abnormal hearts in tones produced by right ventricle and heard best over the left border of the sternum in the fourth or fifth interpace and the left ventricle sounds heard just above and within the apex beat.

The tricuspid being rarely affected the right first sound is proffered as the standard in most cases for comparison with the left first sound.

The right and left first tone being probably a combined production of valve leaflet closure and muscle tension, one or the other components may predominate in diseased condition. According to the theory

of Maritius, supported by Howell, the first apical sound is produced during the closed ventricular period. A systolic murmur replacing the first sound left indicates a leakage. If only replaced during exercise a relative insufficiency exists due to myocardial degeneration.

In aortic regurgitation the first sound left is more pronounced when the leakage is due to an infective process as the degeneration type is likely to involve the myocardium and thus produce a diminution in the muscular element of the sound.

In case the first sound left is changed in quality such change persisting thru exercise, be suspicious of a mitral stenosis. The typical response of these cases to exercise with the development of dyspnoea and peripheral cyanosis may make a diagnosis possible. The size of the heart must indicate which lesion is the more predominant in a double mitral condition.

The first sound right and left is shortened and typical of Graves' disease. In neuro-circulatory-asthenia the first sound right may be normal but as a rule in cases of rapid heart action are much like those in thyroid cases.

In approaching death following infectious disease or shock, the tone of the first sound both right and left is decreased and 24 to 36 hours before death the tick-tack heart is heard in which first and second sounds are alike. Six to twelve hours before death one sound is lost. The author has never found any improvement in the heart sounds from stimulating after these tick-tack heart tones have appeared.

Reduplication of the first sound, though common, has no significance alone. With the institution of gallop rhythm in addition it has the utmost significance. Gallop rhythm he believes a positive indication for digitalis.

THE CEREBROSPINAL FLUID IN MULTIPLE

SCLEROSIS: Joseph E Moore (Arch. Int. Med., Vol. 25 No. 1.) reports his studies on cerebrospinal fluid in multiple sclerosis with special reference to Lange's colloidal gold test. He briefly reviews forty cases from the literature, fourteen of which gave a typical paretic curve, twenty-five were negative and one gave an atypical curve. According to Rotstadt, there was no pleocytosis in 75 per cent of his cases. The author reports twenty-eight cases observed at Johns Hopkins Hospital. In twenty of these, a definite clinical diagnosis of multiple sclerosis was made; in the remaining eight, the diagnosis was questionable. In the twenty definite cases a paretic gold curve and a positive globulin were observed eighteen times or in 90 per cent. The author feels that in the eight questionable cases, the diagnosis was probably not multiple sclerosis because of the atypical findings in the spinal fluid. In three of these, the gold curve was in the syphilitic zone and negative in five cases.

In his summary he states that: "Together with

the clinical evidence, it is believed that the spinal fluid picture is fairly constant, and that, other things being equal, such a picture is a strong argument in favor of a diagnosis of multiple sclerosis. In its absence the diagnosis becomes at least doubtful."

E. M. HAMMES.

TREATMENT OF CHRONIC DACRYOCYSTITIS:

W. L. Bennedict, M. D. and R. A. Barlow, M. D. (Am. Jour. Ophth., Vol. 2 No. 12.) The treatment of chronic dacryocystitis is ultimately surgical, the procedure to be employed depending on the nature and position of the obstruction, extent of the involvement of contiguous structures and changes produced by disease or previous treatment. Destruction of the sac by actual or potential cautery is not advocated. Extripation of the sac after the method of Meller gives satisfactory results in most cases.

As the authors state the treatment of choice is one which restores the function of the sac and provides adequate drainage of diseased ethmoid cells in the neighborhood of the duct.

The operative treatment as performed by the authors is that originated by J. M. West and described as Intranasal Dacrycystostomy or intranasal drainage of the lacrimal sac.

Two drops of a one per cent solution of cocaine are instilled into the eye. This allows the passing of a probe through the punctum. Intranasal anesthesia is obtained by blocking the sphenopalatine ganglion and the anterior ethmoidal nerve by introducing a cotton applicator impregnated with cocaine mud and adrenalin beneath the posterior end of the middle turbinate and a second applicator passed between the septum and middle turbinate to the cribriform plate. These are allowed to remain in the nares for ten minutes. A lacrimal probe is now introduced through the lower punctum into the sac and duct as far as it will go, this serving as a guide and land mark.

The mucous membrane of the agger nasi is now elevated and resected; a flap 1 Cm. in diameter is removed from in front of the attachment of the middle turbinate. The bone is next removed by means of a small chisel making a window slightly smaller in diameter than that of the mucosal opening. The inner wall of the lacrimal sac is now exposed; diseased ethmoid cells discharging into the duct are now broken down; the lacrimal probe is manipulated so that the sac wall in the bony opening is tented into the nose; this incised; the portion of the sac removed is made circular corresponding to the bony excision.

The probe is now removed and the sac irrigated through the punctum. This completes the operation and no packing is necessary. The patient is cautioned not to blow the nose too hard. For the first week a solution of zinc sulphate and adrenalin is used.

GEORGE C. DITTMAN.

THE HEART IN BRONCHOPNEUMONIA:

T Stuart Hart, M. A., M. D., (The Am. Jour. Med. Sc., Vol. 158, No. 572, Nov. 1919.) believes that in the majority of these patients the heart does its work remarkably well. The cardiac activity seems to be very similar to the conditions which are observed in uncomplicated typhoid fever. We have a relatively slow pulse-rate, a low blood-pressure, both systolic and diastolic, with a fairly good pulse-pressure, a normal rhythm which rarely becomes irregular. The writer has observed extrasystoles on a few occasions, but not once has he found the development of complete irregularity. The heart sounds are of good quality and murmurs rarely develop. Undoubtedly the marked cyanosis has suggested the thought that the right heart was failing, but if one observes his patients closely he will rarely find other signs to corroborate this point of view. There is no increase in cardiac dullness to the right, no marked epigastric pulsation, no stasis, no exceptional pulsation or distention of the veins discharging into the right auricle. The cyanosis which is so prominent a feature must be explained on grounds other than insufficiency of the right heart. The writer is personally convinced that the ordinary cause of death is not heart failure. The heart usually preserves its efficiency up to a few hours before the termination, and then only gives way against overwhelming odds.

In the few uncomplicated cases carefully studied postmortem by Dr. A. A. Eggstein the heart showed only a moderate degree of myocardial degeneration and failed to lend weight to the view that death was due primarily to myocardial insufficiency. A number of the writer's cases died with evidence of pulmonary edema, but even in these the heart seemed to be performing its part with reasonable efficiency.

The fatal termination presented the picture of an overwhelming toxemia. As evidence of this may be cited the extreme cyanosis, the leukopenia, the diminished coagulability of the blood, the fever, the delirium which so frequently develops in the severe

cases and in the less severe that are protracted, and the great mortality in pregnant women. Certain of the phenomena point to a defect in the capillary wall as an important element; others suggest fundamental alterations in the elements of the blood. Incidentally, it may be stated that a number of observations on the carbon dioxide content of the blood showed this to be normal in every instance. This would indicate that the cyanosis is not due to a condition of acidosis.

In summarizing his findings the writer concludes:

That individuals with chronic cardiac valvular disease withstood the toxemia of the pneumonia of this epidemic very badly.

That individuals with normal hearts, who developed pneumonia, did not ordinarily die from cardiac insufficiency, and the postmortem examinations offer no proof that these hearts were essentially damaged.

That digitalis acts on the cardiac apparatus of these pneumonias in the same manner as in a similar series of hearts without complicating pneumonias.

That digitalis reduced the heart-rate only in cases of auricular fibrillation and in cases where it was administered in quantities sufficient to produce an actual auriculoventricular block.

That the administration of digitalis did not influence blood pressure.

In view of the apparently widespread belief that death in pneumonia is usually due to heart failure and the almost universal dependence that is placed on digitalis in this condition, it behooves us to examine critically the fragments of evidence which we have been able to accumulate in the recent epidemic.

The employment of a method directed against a wrong conception of the pathology may lead to a false sense of security and keep us from directing our efforts to secure remedies better fitted to combat the true pathological condition.

E. T. F. RICHARDS.



BOOK REVIEWS

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American Illustrated Dictionary. Dorland. W. B. Saunders Co. 10th Ed., 1920. \$6.50.

Practical Organotherapy. Harrower. Harrower Laboratory, 1920.

Medical Clinics of North America. Vol. 3, No. 3, Nov. 1919, W. B. Saunders Co.

Roentgen Interpretation. George W. Holmes and Howard E. Ruggles. Lea & Febiger, 1919. \$2.75.

The author before proceeding to outline abnormal processes briefly mentions some of the confusing shadows and artefacts normally found in certain cases under various conditions. Occasionally lines of the epiphysis, one bone overlapping another, or markings of a blood vessel may be mistaken for a fracture. Then too, roughening of the margins of bones may simulate a periostitis. Calcifications frequently occur in blood vessels, cartilages, tendons, tuberculous glands, foreign bodies and tumors. In rapid growth and healed infections, there may be increased density in the spongy bone. Anatomical variations and the stages of development must always be present in the minds of those who study X-ray phenomena. The skull may show absence of certain bones, variations in the width of the sutures, or sinuses varying greatly in size and shape. Not infrequently extra vertebrae, extra bodies, or portions, lack of union, long or short processes are found pressing on nerves. Cervical and upper lumbar ribs are frequently demonstrated. Variations, deformities, partial or total absence of scapulae, tarsal or carpal bones occur too frequently not to be remembered.

In fractures and dislocations, the author calls special attention to rule out normal shadows, to take a stereoscopic picture wherever possible and lastly to take at least two plates at right angles one to another. Again, in the inflammatory diseases of the bone, such as osteomyelitis, tuberculosis, syphilis, typhoid, actinomycosis, leprosy, etc., great emphasis is placed on the systematic examination of the medulla, cortex, and soft parts. One should also try to determine whether or not the lesion is multiple, invading the epiphysis or the joint. In addition, careful examination of the neighboring bones for destruction, proliferation, or both should not be neglected.

A list of the benign as well as malignant bone tumors has been carefully prepared and discussed. Pulmonary osteoarthropathy, acromegaly, rickets, scorbutus, achondroplasia, (osteogenesis imperfecta) osteomalacia, and other diseases of nutrition have been outlined with their differentiating characteristics in some detail. The chapter dealing with the skull, its contents, sinuses, mastoids, teeth and frac-

tures, has been prepared in a most interesting manner. Too much cannot be said about the many conditions which affect the joints, tendons and bursae. In enumerating and discussing these states, our attention is called to the periarticular swelling in the soft part, to the effusion in the joint; to the erosion of cartilage, to the changes in density of the bone, to the outgrowths of new bone formation and finally, to the number of joints involved.

It would be most unfair to try incorporating even in a rudimentary manner in this review, the various conditions of the chest which have been most elaborately discussed by the author. Gastro-intestinal technic with the interpretations of the numerous lesions occupies a very important place in the whole work. The genito-urinary tract has been given also the most careful consideration.

In conclusion, it may be of value to mention that the book is composed of nine chapters; has over two hundred well chosen illustrations of the various types of lesions. A rich bibliography following each chapter with a complete index at the end of the book, make this volume most attractive to anyone interested in the progress of medicine.

JOHN A. LAPEK.

Practitioner's Manual of Venereal Diseases. A. C. Magian, M. D. C. V. Mosby Co., St. Louis, 1919. \$3.00.

The author enumerates thirty-three remedies used in the treatment of acute gonorrhea, among them glycothymoline, and in the treatment of congenital lues he mentions the value of tonics, and enumerates among others Sanatogen, Valentine's beef juice and Virol. Such ideas almost spoil a good work, for the author gives evidence of being a progressive teacher when he begins his chapter on the treatment of syphilis as follows:

"Before going into the details of the modern treatment of syphilis, I would make the following suggestion to every practitioner. Rid your library of every work on syphilis that is not absolutely up to date. Old-fashioned treatment and ancient methods of diagnosis are the curse of the man who wants to rise out of the common groove. Too many of us are content to carry on with the teaching given us in our student days. As far as the treatment of syphilis is concerned that teaching is obsolete."

The modern treatment which is given is surely to be commended to the practitioner. Owing to the historical references the work is more interesting than the average manual.

E. C. GAGER.

